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(54) **PERSONAL CARE COMPOSITIONS COMPRISING MALODOR REDUCTION COMPOSITIONS**

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(57) **ABSTRACT**

The present invention relates to personal care compositions comprising malodor reduction compositions and methods of making and using such personal care compositions. Such personal care compositions comprising the malodor control technologies disclosed herein provide malodor control without leaving an undesirable scent and when perfume is used to scent such compositions, such scent is not unduly altered by the malodor control technology.

4 Claims, No Drawings

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PERSONAL CARE COMPOSITIONS COMPRISING MALODOR REDUCTION COMPOSITIONS

FIELD OF THE INVENTION

The present invention relates to personal care compositions comprising malodor reduction compositions and methods of making and using such personal care compositions.

BACKGROUND OF THE INVENTION

Unscented or scented products are desired by consumers as they may be considered more natural and discreet than scented products. Manufacturers of unscented or scented products for controlling malodors rely on malodor reduction ingredients or other technologies (e.g. filters) to reduce malodors. However, effectively controlling malodors, for example, amine-based malodors (e.g. fish and urine), thiol and sulfide-based malodors (e.g. garlic and onion), C_2-C_{12} carboxylic acid based malodors (e.g. body and pet odor), indole based malodors (e.g. fecal and bad breath), short chain fatty aldehyde based malodors (e.g. grease) and geosmin based malodors (e.g. mold/mildew) may be difficult, and the time required for a product to noticeably reduce malodors may create consumer doubt as to the product's efficacy on malodors. Often times, manufacturers incorporate scented perfumes to help mask these difficult malodors.

Unfortunately, malodor control technologies typically cover up the malodor with a stronger scent and thus interfere with the scent of the perfumed or unperfumed situs that is treated with the malodor control technology. Thus, limited nature of the current malodor control technologies is extremely constraining. Thus what is needed is a broader palette of malodor control technologies so the perfume community can deliver the desired level of character in a greater number of situations/applications. Surprisingly, Applicants recognized that in addition to blocking a malodor's access to a sensory cell, in order to achieve the desired goal, a malodor control technology must leave such sensor cell open to other molecules, for example scent molecules. Thus, personal care compositions comprising the malodor control technologies disclosed herein provide malodor control without leaving an undesirable scent and, when perfume is used to scent such compositions, such scent is not unduly altered by the malodor control technology.

SUMMARY OF THE INVENTION

The present invention relates to personal care compositions comprising malodor reduction compositions and methods of making and using such personal care compositions. Such personal care compositions comprising the malodor control technologies disclosed herein provide malodor control without leaving an undesirable scent and, when perfume is used to scent such compositions, such scent is not unduly altered by the malodor control technology.

DETAILED DESCRIPTION OF THE INVENTION

Definitions

"Personal care composition" refers to compositions intended for topical application to skin or hair and can be, for example, in the form of a liquid, semi-liquid cream, lotion, gel, or solid. Examples of personal care compositions can include, but are not limited to, bar soaps, shampoos, conditioning shampoos, body washes, moisturizing body washes, shower gels, skin cleansers, cleansing milks, in-shower body moisturizers, pet shampoos, shaving preparations, etc.

"Bar soap" refers to compositions intended for topical application to a surface such as skin or hair to remove, for example, dirt, oil, and the like. The bar soaps can be rinse-off formulations, in which the product is applied topically to the skin or hair and then subsequently rinsed within minutes from the skin or hair with water. The product could also be wiped off using a substrate. Bar soaps can be in the form of a solid (e.g., non-flowing) bar soap intended for topical application to skin. The bar soap can also be in the form of a soft solid which is compliant to the body. The bar soap additionally can be wrapped in a substrate which remains on the bar during use.

"Rinse-off" means the intended product usage includes application to skin and/or hair followed by rinsing and/or wiping the product from the skin and/or hair within a few seconds to minutes of the application step.

"STnS" refers to sodium trideceth(n) sulfate, wherein n can define the average number of moles of ethoxylate per molecule.

"Structured" refers to having a rheology that can confer stability on the personal care composition. A cleansing phase can be considered to be structured if the cleansing phase has one or more following characteristics: (a) Zero Shear Viscosity of at least 100 Pascal-seconds (Pa-s), at least about 200 Pa-s, at least about 500 Pa-s, at least about 1,000 Pa-s, at least about 1,500 Pa-s, or at least about 2,000 Pa-s; (b) A Structured Domain Volume Ratio as measured by the Ultracentrifugation Method described hereinafter, of greater than about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, or at least about 90%; or (c) A Young's Modulus of greater than about 2 Pascals (Pa), greater than about 10 Pa, greater than about 20 Pa, greater than about 30 Pa, greater than about 40 Pa, greater than about 50 Pa, greater than about 75 Pa, or greater than about 100 Pa.

As used herein "MORV" is the calculated malodor reduction value for a subject material. A material's MORV indicates such material's ability to decrease or even eliminate the perception of one or more malodors. For purposes of the present application, a material's MORV is calculated in accordance with method found in the test methods section of the present application.

As used herein, "malodor" refers to compounds generally offensive or unpleasant to most people, such as the complex odors associated with bowel movements.

As used herein, "odor blocking" refers to the ability of a compound to dull the human sense of smell.

As used herein, the term "perfume" does not include malodor reduction materials. Thus, the perfume portion of a composition does not include, when determining the perfume's composition, any malodor reduction materials found in the composition as such malodor reduction materials are described herein. In short, if a material has a malodor reduction value "MORV" that is within the range of the MORV recited in the subject claim, such material is a malodor reduction material for purposes of such claim.

As used herein, the terms "a" and "an" mean "at least one".

As used herein, the terms "include", "includes" and "including" are meant to be non-limiting.

Unless otherwise noted, all component or composition levels are in reference to the active portion of that component or composition, and are exclusive of impurities, for example, residual solvents or by-products, which may be present in commercially available sources of such components or compositions.

All percentages and ratios are calculated by weight unless otherwise indicated. All percentages and ratios are calculated based on the total composition unless otherwise indicated.

It should be understood that every maximum numerical limitation given throughout this specification includes every lower numerical limitation, as if such lower numerical limitations were expressly written herein. Every minimum numerical limitation given throughout this specification will include every higher numerical limitation, as if such higher numerical limitations were expressly written herein. Every numerical range given throughout this specification will include every narrower numerical range that falls within such broader numerical range, as if such narrower numerical ranges were all expressly written herein.

Personal Care Compositions

Rinse-off personal care compositions can come in a variety of forms. For example, a personal care composition can be in a liquid form and can be a body wash, moisturizing body wash, shampoo, conditioning shampoo, shower gel, skin cleansers, cleansing milk, in-shower body moisturizer, pet shampoo, shaving preparation, etc. Rinse-off personal care compositions can also be in a solid form, such as a bar soap or can be in a semi-solid form, like a paste or gel. Solid forms can also be created in many shapes and forms such as a rectangle, or be created in a powder or pellet form, for example. Additionally, solid and semi-solid forms can be combined with a substrate to form an article as described in more detail in U.S. Pre-Grant Publication Nos. 2012/0246851 A1; 2013/0043145 A1; 2013/0043146 A1; and 2013/0043147 A1.

Many personal care compositions can be water-based. However, water can be lost through processes such as evaporation during the process of making a personal care composition, or can be lost to packaging materials or the like after manufacturing. A personal care composition can, therefore, also include materials that bind water inside the composition such that the desired level of water can be maintained in the personal care composition. Examples of such materials can include carbohydrate structurants and humectants such as glycerin. Personal care compositions can also be anhydrous and can be produced or used without any appreciable water content.

Personal care compositions can include perfume materials. Many consumers prefer personal care compositions that can consistently provide a desired scent, or odor, that can be perceived each time the product is used. Perfume materials can provide the desired scent or odor to these personal care compositions. These perfume (i.e., fragrance) materials can include perfumes, perfume raw materials, and perfume delivery systems.

Malodor Reduction Materials

A non-limiting set of suitable malodor reduction materials are provided in the tables below. For ease of use, each material in Tables 1-3 is assigned a numerical identifier which is found in the column for each table that is designated Number. Table 4 is a subset of Table 1, Table 5 is a subset of Table 2 and Table 6 is a subset of Table 3 and there for Tables 4, 5 and 6 each use the same numerical identifier as found, respectively, in Tables 1-3.

Codes

A = Vapor Pressure > 0.1 torr
B = Vapor Pressure is between 0.01 torr and 0.1 torr
C = LogP < 3
D = LogP > 3
E = Probability of Ingredient Color Instability = 0%
F = Probability of Ingredient Color Instability < 71%
G = Odor Detection Threshold less than p.ol = 8
H = Odor Detection Threshold greater than p.ol = 8
I = Melamine formaldehyde PMC Headspace Response Ratio greater than or equal to 10
J = Melamine formaldehyde PMC leakage less than or equal to 5%
K = Log of liquid dish neat product liquid-air partition coefficient greater than or equal to −7
L = Log of liquid dish neat product liquid-air partition coefficient greater than or equal to −5

TABLE 1

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
1	2-ethylhexyl (Z)-3-(4-methoxyphenyl)acrylate	5466-77-3	DEFHJ
2	2,4-dimethyl-2-(5,5,8,8-tetramethyl-5,6,7,8-tetrahydronaphthalen-2-yl)-1,3-dioxolane	131812-67-4	DFHJ
3	1,1-dimethoxynon-2-yne	13257-44-8	ACEFHJK
4	para-Cymen-8-ol	1197-01-9	BCGIJK
7	3-methoxy-7,7-dimethyl-10-methylenebicyclo[4.3.1]decane	216970-21-7	BDEFHJK
9	Methoxycyclododecane	2986-54-1	DEFHJK
10	1,1-dimethoxycyclododecane	950-33-4	DEFHJK
11	(Z)-tridec-2-enenitrile	22629-49-8	DEFHJK
13	Oxybenzone	131-57-7	DEFGJ
14	Oxyoctaline formate	65405-72-3	DFHJK
16	4-methyl-1-oxaspiro[5.5]undecan-4-ol	57094-40-3	CFGIJK
17	7-methyl-2H-benzo[b][1,4]dioxepin-3(4H)-one	28940-11-6	CGIK
18	1,8-dioxacycloheptadecan-9-one	1725-01-5	DGJ
21	4-(tert-pentyl)cyclohexan-1-one	16587-71-6	ADFGIJKL
22	o-Phenyl anisol	86-26-0	DEFHJK
23	3a,5,6,7,8,8b-hexahydro-2,2,6,6,7,8,8-heptamethyl-4H-indeno(4,5-d)-1,3-dioxole	823178-41-2	DEFHJK
25	7-isopropyl-8,8-dimethyl-6,10-dioxaspiro[4.5]decane	62406-73-9	BDEFHIJK
28	Octyl 2-furoate	39251-88-2	DEFHJK
29	Octyl acetate	112-14-1	BDEFHJKL
30	octanal propylene glycol acetal	74094-61-4	BDEFHJKL
31	Octanal	124-13-0	ACHIKL
32	Octanal dimethyl acetal	10022-28-3	ACEFGJKL
33	Myrcene	123-35-3	ADEFGIKL
34	Myrcenol	543-39-5	BCEFGIJK
35	Myrcenyl acetate	1118-39-4	ADEFGJK
36	Myristaldehyde	124-25-4	DFHJK
37	Myristicine	607-91-0	CGJK
38	Myristyl nitrile	629-63-0	DEFHJK
39	2,2,6,8-tetramethyl-1,2,3,4,4a,5,8,8a-octahydronaphthalen-1-ol	103614-86-4	DEFHIJK
42	Ocimenol	5986-38-9	BCHIJK
43	Ocimenol	28977-58-4	BCHIJK
47	Nopyl acetate	128-51-8	DEFHJK
48	Nootkatone	4674-50-4	DHJK
49	Nonyl alcohol	143-08-8	BDEFGIJKL
50	Nonaldehyde	124-19-6	ADHIKL
52	12-methyl-14-tetradec-9-enolide	223104-61-8	DFHJK
57	N-ethyl-p-menthane-3-carboxamide	39711-79-0	DEFGIJK
61	1-(3-methylbenzofuran-2-yl)ethan-1-one	23911-56-0	CEFHIK
62	2-methoxynaphthalene	93-04-9	BDEFHK
63	Nerolidol	7212-44-4	DEFHJK
64	Nerol	106-25-2	BCHIK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
65	1-ethyl-3-methoxytricyclo[2.2.1.02,6]heptane	31996-78-8	ACEFHIJKL
67	Methyl (E)-non-2-enoate	111-79-5	ADEFHJKL
68	10-isopropyl-2,7-dimethyl-1-oxaspiro[4.5]deca-3,6-diene	89079-92-5	BDEFHIJK
69	2-(2-(4-methylcyclohex-3-en-1-yl)propyl)cyclopentan-1-one	95962-14-4	DHJK
70	Myrtenal	564-94-3	ACFHIJKL
71	(E)-4-(2,2,3,6-tetramethylcyclohexyl)but-3-en-2-one	54992-90-4	BDEFHIJK
74	Myraldyl acetate	53889-39-7	DHJK
75	Musk tibetine	145-39-1	DHIJ
76	1,7-dioxacycloheptadecan-8-one	3391-83-1	DGJ
77	Musk ketone	81-14-1	DHJ
78	Musk ambrette	83-66-9	DHIJ
79	3-methylcyclopentadecan-1-one	541-91-3	DEFHJK
80	(E)-3-methylcyclopentadec-4-en-1-one	82356-51-2	DHJK
82	3-methyl-4-phenylbutan-2-ol	56836-93-2	BCEFHIK
83	1-(4-isopropylcyclohexyl)ethan-1-ol	63767-86-2	BDEFHIJK
85	Milk Lactone	72881-27-7	DEFHJK
91	Methyl octine carbonate	111-80-8	BDEFHKL
92	Methyl octyl acetaldehyde	19009-56-4	ADFHJKL
93	6,6-dimethoxy-2,5,5-trimethylhex-2-ene	67674-46-8	ACHIJKL
98	Methyl phenylethyl carbinol	2344-70-9	BCEFHIK
100	Methyl stearate	112-61-8	DEFHJ
101	Methyl nonyl acetaldehyde dimethyl acetal	68141-17-3	BDEFHJK
102	Methyl nonyl ketone	112-12-9	BDFHJKL
103	Methyl nonyl acetaldehyde	110-41-8	BDFHJK
104	Methyl myristate	124-10-7	DEFHJK
105	Methyl linoleate	112-63-0	DEFHJ
106	Methyl lavender ketone	67633-95-8	CFHJK
108	Methyl isoeugenol	93-16-3	ACEFHK
109	Methyl hexadecanoate	112-39-0	DEFHJK
110	Methyl eugenol	93-15-2	ACEFHK
112	Methyl epijasmonate	1211-29-6	CHJK
113	Methyl dihydrojasmonate	24851-98-7	DFHJK
114	Methyl diphenyl ether	3586-14-9	DEFHJK
117	Methyl cinnamate	103-26-4	BCEFHK
119	Methyl chavicol	140-67-0	ADEFHK
120	Methyl beta-naphthyl ketone	93-08-3	CEFHK
122	Methyl 2-octynoate	111-12-6	ACEFHKL
123	Methyl alpha-cyclogeranate	28043-10-9	ACHIJKL
126	Methoxycitronellal	3613-30-7	ACFGIJK
128	Menthone 1,2-glycerol ketal (racemic)	67785-70-0	CEFHJ
130	Octahydro-1H-4,7-methanoindene-1-carbaldehyde	30772-79-3	BCFHIJKL
134	3-(3-(tert-butyl)phenyl)-2-methylpropanal	62518-65-4	BDHJK
135	(E)-4-(4,8-dimethylnona-3,7-dien-1-yl)pyridine	38462-23-6	DEFHJK
137	(E)-trideca-3,12-dienenitrile	134769-33-8	DEFHJK
140	2,2-dimethyl-3-(m-tolyl)propan-1-ol	103694-68-4	CEFHIJK
141	2,4-dimethyl-4,4a,5,9b-tetrahydroindeno[1,2-d][1,3]dioxine	27606-09-3	CEFHJK
142	Maceal	67845-30-1	BDFHJK
143	4-(4-hydroxy-4-methylpentyl)cyclohex-3-ene-1-carbaldehyde	31906-04-4	CHJ
145	l-Limonene	5989-54-8	ADEFGIJKL
146	(Z)-3-hexen-1-yl-2-cyclopenten-1-one	53253-09-1	BDHK
148	Linalyl octanoate	10024-64-3	DEFHJ
149	Linalyl isobutyrate	78-35-3	BDHJK
152	Linalyl benzoate	126-64-7	DFHJ
153	Linalyl anthranilate	7149-26-0	DFHJ
155	Linalool oxide (furanoid)	60047-17-8	BCHIJK
156	linalool oxide	1365-19-1	CGIJK
158	(2Z,6E)-3,7-dimethylnona-2,6-dienenitrile	61792-11-8	BDEFHJK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
159	3-(4-methylcyclohex-3-en-1-yl)butanal	6784-13-0	ACFHIJK
161	(2,5-dimethyl-1,3-dihydroinden-2-yl)methanol	285977-85-7	CEFHJK
162	3-(4-(tert-butyl)phenyl)-2-methylpropanal	80-54-6	BDHJK
167	(E)-1-(1-methoxypropoxy)hex-3-ene	97358-54-8	ACEFGJKL
168	Leaf acetal	88683-94-7	ACEFGJKL
170	l-Carveol	2102-58-1	BCHIJK
174	Lauryl alcohol	112-53-8	DEFGJK
175	Lauryl acetate	112-66-3	DEFHJK
176	Lauric acid	143-07-7	DEFHJ
177	Lactojasmone	7011-83-8	BDEFHIJKL
178	Lauraldehyde	112-54-9	BDFHJK
179	3,6-dimethylhexahydrobenzofuran-2(3H)-one	92015-65-1	BCEFHIJKL
182	4-(1-ethoxyvinyl)-3,3,5,5-tetramethylcyclohexan-1-one	36306-87-3	BDFHIJK
183	Khusimol	16223-63-5	CEFHJK
184	5-(sec-butyl)-2-(2,4-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane	117933-89-8	DEFHJ
185	(1-methyl-2-((1,2,2-trimethylbicyclo[3.1.0]hexan-3-yl)methyl)cyclopropyl)methanol	198404-98-7	DEFHJK
186	2-propylheptanenitrile	208041-98-9	ADEFHIJKL
187	(E)-6-(pent-3-en-1-yl)tetrahydro-2H-pyran-2-one	32764-98-0	BCFHIKL
189	2-hexylcyclopentan-1-one	13074-65-2	BDFHJKL
190	2-methyl-4-phenyl-1,3-dioxolane	33941-99-0	BCEFGIK
192	2,6,9,10-tetramethyl-1-oxaspiro(4.5)deca-3,6-diene	71078-31-4	BDEFHIJK
193	Isopulegol	89-79-2	BCEFHIJKL
195	Isopropyl palmitate	142-91-6	DEFHJ
196	Isopropyl myristate	110-27-0	DEFHJK
197	Isopropyl dodecanoate	10233-13-3	DEFHJK
199	Isopimpinellin	482-27-9	CFGJ
206	Iso3-methylcyclopentadecan-1-one	3100-36-5	DEFGJK
208	Isomenthone	491-07-6	ADEFGIJKL
209	Isojasmone	95-41-0	BDFHJKL
210	Isomenthone	36977-92-1	ADEFGIJKL
211	Isohexenyl cyclohexenyl carboxaldehyde	37677-14-8	DFHJK
212	Isoeugenyl benzyl ether	120-11-6	DFHJ
215	1-((2S,3S)-2,3,8,8-tetramethyl-1,2,3,4,5,6,7,8-octahydronaphthalen-2-yl)ethan-1-one	54464-57-2	DHJK
218	Isocyclocitral	1335-66-6	ACFHIJKL
221	Isobutyl quinoline	65442-31-1	DEFHJK
227	Isobornylcyclohexanol	68877-29-2	DEFHJK
228	Isobornyl propionate	2756-56-1	BDEFHIJK
229	Isobornyl isobutyrate	85586-67-0	BDEFHIJK
230	Isobornyl cyclohexanol	66072-32-0	DEFHJK
231	Isobornyl acetate	125-12-2	ADEFHIJKL
233	Isobergamate	68683-20-5	DEFHJK
234	Isoamyl undecylenate	12262-03-2	DEFHJK
238	Isoamyl laurate	6309-51-9	DEFHJK
242	Isoambrettolide	28645-51-4	DGJ
243	Irisnitrile	29127-83-1	ADEFHKL
244	Indolene	68527-79-7	DEFHJ
246	Indol/Hydroxycitronellal Schiff base	67801-36-9	DEFHJ
247	4,4a,5,9b-tetrahydroindeno[1,2-d][1,3]dioxine	18096-62-3	BCEFGJK
249	Hydroxy-citronellol	107-74-4	CEFGIJK
252	2-cyclododecylpropan-1-ol	118562-73-5	DEFHJK
253	Hydrocitronitrile	54089-83-7	CEFHJK
254	Hydrocinnamyl alcohol	122-97-4	BCEFHIK
256	Hydratropaldehyde dimethyl acetal	90-87-9	ACEFHJK
259	5-ethyl-4-hydroxy-2-methylfuran-3(2H)-one	27538-09-6	CFGIK
260	2,3-dihydro-3,3-dimethyl-1H-indene-5-propanal	173445-44-8	DHJK
261	3-(3,3-dimethyl-2,3-dihydro-1H-inden-5-yl)propanal	173445-65-3	DHJK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
263	Hexyl octanoate	1117-55-1	DEFHJK
267	Hexyl hexanoate	6378-65-0	DEFHJKL
269	Hexyl cinnamic aldehyde	101-86-0	DHJ
271	Hexyl benzoate	6789-88-4	DEFHJK
274	Hexenyl tiglate	84060-80-0	BDEFHJK
276	(E)-3,7-dimethylocta-2,6-dien-1-yl palmitate	3681-73-0	DEFHJ
277	Hexadecanolide	109-29-5	DEFGJK
278	2-butyl-4,4,6-trimethyl-1,3-dioxane	54546-26-8	ADEFHIJKL
280	Ethyl (1R,2R,3R,4R)-3-isopropylbicyclo[2.2.1]hept-5-ene-2-carboxylate	116126-82-0	BDEFHIJK
281	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl acetate	5413-60-5	CEFGJK
285	2-(1-(3,3-dimethylcyclohexyl)ethoxy)-2-methylpropyl propionate	141773-73-1	DEFHJ
286	Heliotropine diethyl acetal	40527-42-2	CEFGJ
288	Helional	1205-17-0	CHJK
289	(E)-oxacyclohexadec-13-en-2-one	111879-80-2	DGJK
290	Gyrane	24237-00-1	ADEFHIJKL
292	Guaiol	489-86-1	DEFHJK
293	1-(2,6,6-trimethylcyclohex-2-en-1-yl)pentan-3-one	68611-23-4	DHJK
294	Ethyl 2-ethyl-6,6-dimethylcyclohex-2-ene-1-carboxylate	57934-97-1	BDEFHIJK
295	Germacrene B	15423-57-1	DEFHJK
296	Germacrene D	23986-74-5	DEFHJK
300	Geranyl phenylacetate	102-22-7	DFHJ
301	Geranyl phenyl acetate	71648-43-6	DFHJ
303	Geranyl linalool	1113-21-9	DFHJ
307	Geranyl cyclopentanone	68133-79-9	DHJK
316	gamma-Undecalactone (racemic)	104-67-6	DEFHJKL
317	gamma-Terpinyl acetate	10235-63-9	BDHJK
318	gamma-Terpineol	586-81-2	BCGIJK
321	gamma-Nonalactone	104-61-0	BCEFHIKL
322	gamma-Muurolene	30021-74-0	DEFHJKL
323	gamma-(E)-6-(pent-3-en-1-yl)tetrahydro-2H-pyran-2-one	63095-33-0	BCEFHKL
324	gamma-Ionone	79-76-5	BDEFHIJK
325	gamma-Himachalene	53111-25-4	BDEFHJKL
328	gamma-Gurjunene	22567-17-5	DEFHJKL
329	gamma-Eudesmol	1209-71-8	DFHJK
330	gamma-Dodecalactone	2305-05-7	DEFHJK
331	gamma-Damascone	35087-49-1	BDEFHIJK
332	gamma-Decalactone	706-14-9	BDEFHIJKL
333	gamma-Cadinene	39029-41-9	DEFHJKL
334	1-(3,3-dimethylcyclohexyl)pent-4-en-1-one	56973-87-6	BDEFHJK
335	4,6,6,7,8,8-hexamethyl-1,3,4,6,7,8-hexahydrocyclopenta[g]isochromene	1222-05-5	DEFHJK
336	Furfuryl octanoate	39252-03-4	DEFHJK
338	Furfuryl hexanoate	39252-02-3	CEFHJK
339	Furfuryl heptanoate	39481-28-2	CEFHJK
342	2-methyldecanenitrile	69300-15-8	BDEFHJKL
343	8,8-dimethyl-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl propionate	76842-49-4	DEFHJK
344	Ethyl (3aR,4S,7R,7aR)-octahydro-3aH-4,7-methanoindene-3a-carboxylate	80657-64-3	DEFHIJK
347	Diethyl cyclohexane-1,4-dicarboxylate	72903-27-6	CEFHJK
349	(6-isopropyl-9-methyl-1,4-dioxaspiro[4.5]decan-2-yl)methanol	63187-91-7	CEFHJ
350	2-isobutyl-4-methyltetrahydro-2H-pyran-4-ol	63500-71-0	BCEFHIJK
352	Undec-10-enenitrile	53179-04-7	BDEFHJK
353	(Z)-6-ethylideneoctahydro-2H-5,8-methanochromen-2-one	69486-14-2	CEFGJK
356	3-(2-ethylphenyl)-2,2-dimethylpropanal	67634-15-5	BDHJK
358	(E)-4,8-dimethyldeca-4,9-dienal	71077-31-1	BDFHJK
359	(E)-4-((3aR,4R,7R,7aR)-1,3a,4,6,7,7a-hexahydro-5H-4,7-methanoinden-5-ylidene)-3-methylbutan-2-ol	501929-47-1	DEFHJK
360	8,8-dimethyl-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl acetate	171102-41-3	DEFHJK
361	3-(4-ethylphenyl)-2,2-dimethylpropanenitrile	134123-93-6	DEFHJK
362	2-heptylcyclopentan-1-one	137-03-1	DFHJKL
363	1-ethoxyethoxy Cyclododecane	389083-83-4	DEFHJK
364	3-cyclohexene-1-carboxylic acid, 2,6,6-trimethyl-, methyl ester	815580-59-7	ACHIJKL
368	Farnesyl acetate	29548-30-9	DEFHJK
369	Farnesol	4602-84-0	DEFHJK
370	Oxacyclohexadecan-2-one	106-02-5	DEFGJK
371	1-cyclopentadec-4-en-1-one	14595-54-1	DEFGJK
372	1-cyclopentadec-4-en-1-one	35720-57-1	DEFGJK
373	2-methoxy-4-(4-methylenetetrahydro-2H-pyran-2-yl)phenol	128489-04-3	CGJ
374	Eugenyl acetate	93-28-7	CFHJK
375	Eugenol	97-53-0	CHIK
377	Ethylmethylphenylglycidate	77-83-8	CFHJK
378	Ethylene brassylate	105-95-3	DFGJ
381	Ethyl undecylenate	692-86-4	DEFHJK
385	Ethyl palmitate	628-97-7	DEFHJ
386	Ethyl nonanoate	123-29-5	BDEFHJKL
388	Ethyl myristate	124-06-1	DEFHJK
390	Ethyl linalool	10339-55-6	BCEFHJK
391	Ethyl laurate	106-33-2	DEFHJK
394	Ethyl hexyl ketone	925-78-0	ADFHIKL
397	Ethyl decanoate	110-38-3	BDEFHJK
398	Ethyl gamma-Safranate	35044-57-6	ADHIJK
407	Ethyl 3-phenylglycidate	121-39-1	CGJK
413	6-ethyl-2,10,10-trimethyl-1-oxaspiro[4.5]deca-3,6-diene	79893-63-3	BDEFHIJK
414	Elemol	639-99-6	DEFHJK
415	(2-(1-ethoxyethoxy)ethyl)benzene	2556-10-7	BCEFHJK
416	(E)-3-methyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pent-4-en-2-ol	67801-20-1	DHJK
417	d-xylose	58-86-6	CGIJ
418	(E)-4-((3aS,7aS)-octahydro-5H-4,7-methanoinden-5-ylidene)butanal	30168-23-1	DFHJK
421	Dodecanal dimethyl acetal	14620-52-1	DEFHJK
424	d-Limonene	5989-27-5	ADEFGIJKL
425	Dipropylene Glycol	25265-71-8	CEFGIK
426	Dispirone	83863-64-3	BDEFHJK
428	Diphenyloxide	101-84-8	BDEFHK
429	Diphenylmethane	101-81-5	DEFGK
432	Dimethyl benzyl carbinyl butyrate	10094-34-5	DEFHJK
436	2,6-dimethyloct-7-en-4-one	1879-00-1	ADEFHIJKL
441	Octahydro-1H-4,7-methanoinden-5-yl acetate	64001-15-6	DEFHJKL
444	Dihydrocarveol acetate	20777-49-5	BDEFHIJK
445	Dihydrocarveol	619-01-2	BCEFHIJKL
449	Dihydro Linalool	18479-51-1	BCEFGIJKL
450	Dihydro Isojasmonate	37172-53-5	DHJK
453	Dibutyl sulfide	544-40-1	ADEFHIKL
457	Dibenzyl	103-29-7	DEFGJK
459	delta-Undecalactone	710-04-3	DEFHJKL
461	delta-Elemene	20307-84-0	BDEFHJK
462	delta-Guaiene	3691-11-0	DEFHJKL
463	delta-Dodecalactone	713-95-1	DEFHJK
464	delta-Decalactone	705-86-2	BDEFHIJKL
465	delta-Cadinene	483-76-1	DEFHJKL
466	delta-damascone	57378-68-4	ADHIJK
467	delta-Amorphene	189165-79-5	DEFHJKL
468	delta-3-Carene	13466-78-9	ADEFGIJKL
470	Decylenic alcohol	13019-22-2	BDEFHJK
471	Decyl propionate	5454-19-3	DEFHJK
473	Decanal diethyl acetal	34764-02-8	DEFHJK
474	Decahydro-beta-naphthol	825-51-4	BCEFGIK
475	1-cyclohexylethyl (E)-but-2-enoate	68039-69-0	BDFHJK
478	3-(4-isopropylphenyl)-2-methylpropanal	103-95-7	BDFHJK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
479	Cyclotetradecane	295-17-0	DEFGJKL
480	Cyclopentadecanone	502-72-7	DEFGJK
482	Cyclohexyl salicylate	25485-88-5	DFGJ
484	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl butyrate	113889-23-9	DEFHJK
485	Cyclic ethylene dodecanedioate	54982-83-1	DFGJ
486	8,8-dimethyl-1,2,3,4,5,6,7,8-octahydronaphthalene-2-carbaldehyde	68991-97-9	DHJK
487	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-5-yl isobutyrate	67634-20-2	DEFHJK
488	Curzerene	17910-09-7	DHJK
491	Cumic alcohol	536-60-7	CHIJK
493	Coumarone	1646-26-0	BCEFHIK
497	2-(3-phenylpropyl)pyridine	2110-18-1	CEFHJK
498	Dodecanenitrile	2437-25-4	DEFHJK
501	(E)-cycloheptadec-9-en-1-one	542-46-1	DEFGJ
502	Citryl acetate	6819-19-8	DFHJK
503	Citrus Propanol	15760-18-6	CEFHIJK
505	Citronitrile	93893-89-1	CEFHJK
519	Citral propylene glycol acetal	10444-50-5	CEFHJK
520	Citral dimethyl acetal	7549-37-3	BCEFHJK
521	Citral diethyl acetal	7492-66-2	BDEFHJK
524	cis-Ocimene	3338-55-4	ADGIKL
527	cis-Limonene oxide	13837-75-7	ADEFGIJKL
529	Cis-iso-ambrettolide	36508-31-3	DGJ
530	cis-6-nonenol	35854-86-5	BCEFHIKL
531	cis-carveol	1197-06-4	BCHIJK
532	cis-4-Decen-1-al	21662-09-9	ADHKL
534	cis-3-hexenyl-cis-3-hexenoate	61444-38-0	BDEFHJK
537	cis-3-Hexenyl salicylate	65405-77-8	DEFGJ
541	Cis-3-hexenyl Benzoate	25152-85-6	DEFHJK
544	cis-3-Hexenyl 2-methylbutyrate	53398-85-9	ADEFHJKL
546	cis-3, cis-6-nonadienol	53046-97-2	ACEFHK
548	Cinnamyl propionate	103-56-0	DEFHJK
550	Cinnamyl isobutyrate	103-59-3	DEFHJK
551	Cinnamyl formate	104-65-4	BCEFHK
552	Cinnamyl cinnamate	122-69-0	DHJ
553	Cinnamyl acetate	103-54-8	BCEFHK
555	Cinnamic alcohol	104-54-1	BCEFHIK
558	Cetyl alcohol	36653-82-4	DEFHJ
559	(E)-1-(2,6,6-trimethylcyclohex-2-en-1-yl)hepta-1,6-dien-3-one	79-78-7	DHJK
560	2-methyl-4-(2,6,6-trimethylcyclohex-1-en-1-yl)butanal	65405-84-7	DFHJK
561	(3aR,5aR,9aR,9bR)-3a,6,6,9a-tetramethyldodecahydronaphtho[2,1-b]furan	3738-00-9	DEFHJK
562	1,6-dioxacycloheptadecan-7-one	6707-60-4	DGJ
563	1-(6-(tert-butyl)-1,1-dimethyl-2,3-dihydro-1H-inden-4-yl)ethan-1-one	13171-00-1	DEFHJK
565	Cedryl methyl ether	19870-74-7	ADEFHJK
566	Cedryl formate	39900-38-4	BDEFHJK
567	Cedryl acetate	77-54-3	DEFHJK
568	(4Z,8Z)-1,5,9-trimethyl-13-oxabicyclo[10.1.0]trideca-4,8-diene	71735-79-0	DFHJK
569	Cedrol	77-53-2	DEFHJK
570	5-methyl-1-(2,2,3-trimethylcyclopent-3-en-1-yl)-6-oxabicyclo[3.2.1]octane	139539-66-5	DEFHJK
571	5-methyl-1-(2,2,3-trimethylcyclopent-3-en-1-yl)-6-oxabicyclo[3.2.1]octane	426218-78-2	DFHJ
572	1,1,2,3,3-pentamethyl-1,2,3,5,6,7-hexahydro-4H-inden-4-one	33704-61-9	BDEFHIJK
573	Caryophyllene alcohol acetate	32214-91-8	DEFHJK
574	Caryolan-1-ol	472-97-9	DEFHJK
577	Carvyl acetate	97-42-7	BDHIJK
578	Caprylnitrile	124-12-9	ACEFGIKL
580	Caprylic alcohol	111-87-5	ACEFGIKL
581	Caprylic acid	124-07-2	BCEFHIK
582	Capric acid	334-48-5	DEFHJK
584	Capraldehyde	112-31-2	ADHKL
586	3-(4-methoxyphenyl)-2-methylpropanal	5462-06-6	BCHJK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
587	Camphorquinone	10373-78-1	ACEFGIJK
589	Camphene	79-92-5	ADEFGIJKL
591	Ethyl 2-methyl-4-oxo-6-pentylcyclohex-2-ene-1-carboxylate	59151-19-8	DHJ
592	Butylated hydroxytoluene	128-37-0	DEFGIJK
594	Butyl stearate	123-95-5	DEFHJ
595	Butyl butyryl lactate	7492-70-8	CEFGJK
599	Butyl 10-undecenoate	109-42-2	DEFHJK
600	2-methyl-4-(2,2,3-trimethylcyclopent-3-en-1-yl)butan-1-ol	72089-08-8	DEFHJK
601	3-(4-(tert-butyl)phenyl)propanal	18127-01-0	BDHJK
603	Bornyl isobutyrate	24717-86-0	BDEFHIJK
604	Bornyl acetate	76-49-3	ADEFHIJKL
606	2-ethoxy-2,6,6-trimethyl-9-methylenebicyclo[3.3.1]nonane	68845-00-1	BDEFHJK
607	(ethoxymethoxy)cyclododecane	58567-11-6	DEFHJK
608	Bisabolene	495-62-5	DEFHJK
609	Bigarade oxide	72429-08-4	ADEFHJKL
610	beta-Vetivone	18444-79-6	DHJK
611	beta-Terpinyl acetate	10198-23-9	BDHJK
612	beta-Terpineol	138-87-4	BCGIJK
613	beta-Sinensal	60066-88-8	DHJK
614	beta-Sesquiphellandrene	20307-83-9	DEFHJK
615	beta-Selinene	17066-67-0	BDEFGJK
616	beta-Santalol	77-42-9	DEFHJK
618	beta-Pinene	127-91-3	ADEFGIJKL
620	beta-Naphthyl ethyl ether	93-18-5	BDEFHJK
621	beta-Patchoulline	514-51-2	BDEFGJKL
624	beta-Himachalene Oxide	57819-73-5	BDFHJK
625	beta-Himachalene	1461-03-6	DEFHJKL
626	beta-Guaiene	88-84-6	DEFHJKL
627	(2,2-dimethoxyethyl)benzene	101-48-4	DHJK
628	beta-Farnesene	18794-84-8	DEFHJK
631	beta-Copaene	18252-44-3	BDEFHJKL
632	beta-Cedrene	546-28-1	BDEFGJKL
633	beta-Caryophyllene	87-44-5	DEFHJKL
635	beta-Bisabolol	15352-77-9	DFHJK
636	Beta ionone epoxide	23267-57-4	BDEFHIJK
638	Bergaptene	484-20-8	CGJ
639	Benzyl-tert-butanol	103-05-9	CEFGJK
644	Benzyl laurate	140-25-0	DEFHJ
649	Benzyl dimethyl carbinol	100-86-7	BCEFGIK
650	Benzyl cinnamate	103-41-3	DHJ
653	Benzyl benzoate	120-51-4	DHJ
655	Benzophenone	119-61-9	DEFHK
658	7-isopentyl-2H-benzo[b][1,4]dioxepin-3(4H)-one	362467-67-2	DHJ
659	2'-isopropyl-1,7,7-trimethylspiro[bicyclo[2.2.1]heptane-2,4'-[1,3]dioxane]	188199-50-0	DEFHJK
660	4-(4-methylpent-3-en-1-yl)cyclohex-3-ene-1-carbonitrile	21690-43-7	DEFHJK
661	Aurantiol	89-43-0	DEFHJ
663	Anisyl phenylacetate	102-17-0	DFHJ
668	Methyl (E)-octa-4,7-dienoate	189440-77-5	ACEFHKL
671	Amyl Cinnamate	3487-99-8	DEFHJK
673	(3aR,5aS,9aS,9bR)-3a,6,6,9a-tetramethyldodecahydronaphtho[2,1-b]furan	6790-58-5	DEFHJK
674	(4aR,5R,7aS,9R)-2,2,5,8,8,9a-hexamethyloctahydro-4H-4a,9-methanoazuleno[5,6-d][1,3]dioxole	211299-54-6	DEFHJK
675	2,5,5-trimethyl-1,2,3,4,5,6,7,8-octahydronaphthalen-2-ol	71832-76-3	DEFHJK
676	2,5,5-trimethyl-1,2,3,4,5,6,7,8-octahydronaphthalen-2-ol	41199-19-3	DEFHJK
677	1-((2-(tert-butyl)cyclohexyl)oxy)butan-2-ol	139504-68-0	DEFHJK
678	(3S,5aR,7aS,11aS,11bR)-3,8,8,11a-tetramethyldodecahydro-5H-3,5a-epoxynaphtho[2,1-c]oxepine	57345-19-4	DEFHJ
679	2,2,6,6,7,8,8-heptamethyldecahydro-2H-indeno[4,5-b]furan	476332-65-7	ADEFHJK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
680	2,2,6,6,7,8,8-heptamethyldecahydro-2H-indeno[4,5-b]furan	647828-16-8	ADEFHJK
681	Amber acetate	37172-02-4	BDEFHJK
682	Alpinofix	811436-82-5	DEFHJ
683	alpha-Thujone	546-80-5	ADEFGIJKL
684	alpha-Vetivone	15764-04-2	DHJK
686	alpha-Terpinyl propionate	80-27-3	BDEFHJK
691	alpha-Sinensal	17909-77-2	DHJK
692	alpha-Selinene	473-13-2	BDEFHJK
693	alpha-Santalene	512-61-8	ADEFHJKL
694	alpha-Santalol	115-71-9	DEFHJK
696	alpha-Patchoulene	560-32-7	ADEFHJKL
697	alpha-neobutenone	56973-85-4	BDHJK
698	alpha-Muurolene	10208-80-7	DEFHJKL
700	alpha-methyl ionone	127-42-4	BDHJK
702	alpha-Limonene	138-86-3	ADEFGIJKL
704	alpha-Irone	79-69-6	BDHJK
706	alpha-Humulene	6753-98-6	DEFHJK
707	alpha-Himachalene	186538-22-7	BDEFHJK
708	alpha-Gurjunene	489-40-7	BDEFHJKL
709	alpha-Guaiene	3691-12-1	DEFHJKL
710	alpha-Farnesene	502-61-4	DEFHJK
711	alpha-Fenchene	471-84-1	ADEFGIJKL
712	alpha-Eudesmol	473-16-5	DEFHJK
713	alpha-Curcumene	4176-17-4	DEFHJK
714	alpha-Cubebene	17699-14-8	ADEFHJKL
715	alpha-Cedrene epoxide	13567-39-0	ADEFHJK
716	alpha-Cadinol	481-34-5	DEFHJK
717	alpha-Cadinene	24406-05-1	DEFHJKL
718	alpha-Bisabolol	515-69-5	DFHJK
719	alpha-bisabolene	17627-44-0	DEFHJK
720	alpha-Bergamotene	17699-05-7	BDEFHJKL
721	alpha-Amylcinnamyl alcohol	101-85-9	DEFHJ
722	alpha-Amylcinnamyl acetate	7493-78-9	DEFHJ
723	alpha-Amylcinnamaldehyde diethyl acetal	60763-41-9	DEFHJ
724	alpha-Amylcinnamaldehyde	122-40-7	DHJK
725	alpha-Amorphene	23515-88-0	DEFHJKL
726	alpha-Agarofuran	5956-12-7	BDEFHJK
727	1-methyl-4-(4-methyl-3-penten-1-yl)-3-Cyclohexene-1-carboxaldehyde	52475-86-2	DFHJK
730	1-Phenyl-2-pentanol	705-73-7	CEFHK
731	1-Phenyl-3-methyl-3-pentanol	10415-87-9	CEFHJK
733	2,3,4-trimethoxy-benzaldehyde	2103-57-3	BCGI
735	2,4,5-trimethoxy-benzaldehyde	4460-86-0	BCG
736	2,4,6-trimethoxybenzaldehyde	830-79-5	BCGI
738	2,4-Nonadienal	6750-03-4	ACHKL
741	2,6,10-Trimethylundecanal	105-88-4	BDFGJK
742	alpha,4-Dimethyl benzenepropanal	41496-43-9	ACHJK
746	Allyl cyclohexyl propionate	2705-87-5	BDEFHJK
748	Allyl amyl glycolate	67634-00-8	BCEFGJK
750	Allo-aromadendrene	25246-27-9	BDEFHJKL
752	Aldehyde C-11	143-14-6	ADHJK
754	Methyl (E)-2-(((3,5-dimethylcyclohex-3-en-1-yl)methylene)amino)benzoate	94022-83-0	DEFHJ
757	2,6,10-trimethylundec-9-enal	141-13-9	BDFHJK
758	Acetoxymethyl-isolongifolene (isomers)	59056-62-1	BDEFHJK
763	Acetate C9	143-13-5	BDEFHJKL
764	Acetarolle	744266-61-3	DFHJK
766	Acetaldehyde phenylethyl propyl acetal	7493-57-4	CEFHJK
767	Acetaldehyde dipropyl acetal	105-82-8	ACEFGIKL
768	Acetaldehyde benzyl 2-methoxyethyl acetal	7492-39-9	BCEFHJK
769	(Z)-2-(4-methylbenzylidene)heptanal	84697-09-6	DHJ
770	9-decenal	39770-05-3	ADHKL
771	8-Hexadecenolide	123-69-3	DGJ
772	7-Methoxycoumarin	531-59-9	CHK
774	7-epi-alpha-Selinene	123123-37-5	BDEFHJK
775	7-eip-alpha-Eudesmol	123123-38-6	DEFHJK
776	7-Acetyl-1,1,3,4,4,6-hexamethyltetralin	1506-02-1	DEFHJ

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
778	6-Isopropylquinoline	135-79-5	CEFHJK
781	6,6-dimethyl-2-norpinene-2-propionaldehyde	33885-51-7	BCFHJK
782	6,10,14-trimethyl-2-Pentadecanone	502-69-2	DEFHJK
786	5-Isopropenyl-2-methyl-2-vinyltetrahydrofuran	13679-86-2	ACGIJKL
788	5-Cyclohexadecenone	37609-25-9	DEFGJK
791	4-Terpinenol	562-74-3	BCHIJK
792	4-Pentenophenone	3240-29-7	BCEFHIK
800	4-Carvomenthenol	28219-82-1	BCHIJK
802	4,5,6,7-Tetrahydro-3,6-dimethylbenzofuran	494-90-6	BCEFHIJKL
803	4-(p-Methoxyphenyl)-2-butanone	104-20-1	BCEFHJK
804	3-Thujopsanone	25966-79-4	BDEFHJK
805	3-Propylidenephthalide	17369-59-4	CEFHK
806	3-Nonylacrolein	20407-84-5	BDFHJK
807	3-Methyl-5-phenyl-1-pentanal	55066-49-4	BDFHJK
814	3-Hexenyl isovalerate	10032-11-8	ADEFHJKL
821	3,6-Dimethyl-3-octanyl acetate	60763-42-0	ADEFHIJKL
824	3,4,5-trimethoxybenzaldehyde	86-81-7	BCGIK
826	3-(p-Isopropylphenyl)propionaldehyde	7775-00-0	BDFHJK
827	2-Undecenenitrile	22629-48-7	BDEFHJK
828	2-Undecenal	2463-77-6	ADHJK
829	2-trans-6-trans-Nonadienal	17587-33-6	ACHKL
831	2-Phenylethyl butyrate	103-52-6	DEFHJK
833	2-Phenyl-3-(2-furyl)prop-2-enal	57568-60-2	CHJ
834	2-Phenoxyethanol	122-99-6	BCEFGIK
837	2-Nonen-1-al	2463-53-8	ADHKL
839	2-Nonanol	628-99-9	BDEFGIKL
840	2-Nonanone	821-55-6	ADFHIKL
849	2-Isobutyl quinoline	93-19-6	CEFHJK
850	2-Hexylidene cyclopentanone	17373-89-6	DFHJKL
852	2-Heptyl tetrahydrofuran	2435-16-7	BDEFHJKL
856	2-Decenal	3913-71-1	ADHKL
864	2,6-Nonadienal	26370-28-5	ACHKL
865	2,6-Nonadien-1-ol	7786-44-9	ACEFHK
866	2,6-dimethyl-octanal	7779-07-9	ADFGIJKL
868	1-Decanol	112-30-1	BDEFGJK
869	1-Hepten-1-ol, 1-acetate	35468-97-4	ACEFHKL
870	10-Undecen-1-ol	112-43-6	DEFHJK
871	10-Undecenal	112-45-8	ADHJK
872	10-epi-gamma-Eudesmol	15051-81-7	DFHJK
873	1,8-Thiocineol	68391-28-6	ADEFHIJKL
876	1,3,5-undecatriene	16356-11-9	ADEFHJKL
877	1,2-Dihydrolinalool	2270-57-7	BCEFGIJKL
878	1,3,3-trimethyl-2-norbornanyl acetate	13851-11-1	ADEFHIJKL
879	1,1,2,3,3-Pentamethylindan	1203-17-4	ADHIJKL
881	(Z)-6,10-dimethylundeca-5,9-dien-2-yl acetate	3239-37-0	DEFHJK
884	(Z)-3-Dodecenal	68141-15-1	BCFHJK
885	(S)-gamma-Undecalactone	74568-05-1	DEFHJKL
886	(R)-gamma-Undecalactone	74568-06-2	DEFHJKL
890	(E)-6,10-dimethylundeca-5,9-dien-2-yl acetate	3239-35-8	DEFHJK
892	(2Z)-3-methyl-5-phenyl-2-Pentenenitrile	53243-59-7	DEFHJK
893	(2S,5S,6S)-2,6,10,10-tetramethyl-1-oxaspiro[4__5]decan-6-ol	65620-50-0	DFHIJK
894	(2E)-3-methyl-5-phenyl-2-pentenenitrile	53243-60-0	CEFHJK
897	(+)-Dihydrocarveol	22567-21-1	BCEFHIJKL
905	Menthone	89-80-5	ADEFGIJKL
908	(R,E)-2-methyl-4-(2,2,3-trimethylcyclopent-3-en-1-yl)but-2-en-1-ol	185068-69-3	CHJK
912	2-(8-isopropyl-6-methylbicyclo[2.2.2]oct-5-en-2-yl)-1,3-dioxolane	68901-32-6	DEFHJK
913	gamma-methyl ionone	7388-22-9	BDHIJK
914	3-(3-isopropylphenyl)butanal	125109-85-5	BDHJK
916	3-(1-ethoxyethoxy)-3,7-dimethylocta-1,6-diene	40910-49-4	BDEFHJK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
919	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl propionate	17511-60-3	CEFHJK
920	Bulnesol	22451-73-6	DEFHJK
922	Benzyl phenylacetate	102-16-9	DHJ
923	Benzoin	119-53-9	CEFHJ
924	(E)-1,2,4-trimethoxy-5-(prop-1-en-1-yl)benzene	2883-98-9	BCFGJK
925	alpha,alpha,6,6-tetramethyl bicyclo[3.1.1]hept-2-ene-propanal	33885-52-8	BDFHJK
926	7-epi-sesquithujene	159407-35-9	DEFHJKL
927	5-Acetyl-1,1,2,3,3,6-hexamethylindan	15323-35-0	DEFHJK
928	3-Methylphenethyl alcohol	1875-89-4	BCEFHIK
929	3,6-Nonadien-1-ol	76649-25-7	ACEFHK
930	2-Tridecenal	7774-82-5	BDFHJK
933	Patchouli alcohol	5986-55-0	DEFHIJK
937	p-Cresyl isobutyrate	103-93-5	BDHJK
939	p-Cresyl n-hexanoate	68141-11-7	DEFHJK
941	5-hexyl-4-methyldihydrofuran-2(3H)-one	67663-01-8	BDEFHIJKL
942	Ethyl (2Z,4E)-deca-2,4-dienoate	3025-30-7	BDEFHJK
943	Pelargene	68039-40-7	DEFHJK
945	2-cyclohexylidene-2-phenylacetonitrile	10461-98-0	DFHJK
946	Perillaldehyde	2111-75-3	ACHIJK
947	Perillyl acetate	15111-96-3	DFHJK
948	Perillyl alcohol	536-59-4	CHIJK
950	(2-isopropoxyethyl)benzene	68039-47-4	ACEFHJKL
951	Ethyl (2Z,4E)-deca-2,4-dienoate	313973-37-4	BDEFHJK
953	(2-(cyclohexyloxy)ethyl)benzene	80858-47-5	DEFHJK
954	Phenethyl 2-methylbutyrate	24817-51-4	DEFHJK
955	Phenethyl alcohol	60-12-8	BCEFGIK
959	Phenethyl phenylacetate	102-20-5	DHJ
962	Phenoxanol	55066-48-3	DEFHJK
965	Phenyl benzoate	93-99-2	DFHJK
967	Phenyl ethyl benzoate	94-47-3	DHJ
969	Phenylacetaldehyde ethyleneglycol acetal	101-49-5	BCEFGIK
973	2-(6,6-dimethylbicyclo[3.1.1]hept-2-en-2-yl)acetaldehyde	30897-75-7	ACFHIJKL
974	Pinocarveol	5947-36-4	BCEFGIJKL
976	Piperonyl acetone	55418-52-5	CEFGJ
978	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl pivalate	68039-44-1	DEFHJK
980	(4aR,8aS)-7-methyloctahydro-1,4-methanonaphthalen-6(2H)-one	41724-19-0	CEFGJKL
982	p-Menth-3-en-1-ol	586-82-3	BCGIJK
985	(E)-3,3-dimethyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pent-4-en-2-ol	107898-54-4	DHJK
988	1-methyl-4-(4-methylpent-3-en-1-yl)cyclohex-3-ene-1-carbaldehyde	52474-60-9	DFHJK
993	Propylene glycol	57-55-6	ACEFGIKL
998	p-Tolyl phenylacetate	101-94-0	DFHJ
1000	Ethyl 2,4,7-decatrienoate	78417-28-4	BDEFHJK
1003	2-benzyl-4,4,6-trimethyl-1,3-dioxane	67633-94-7	DEFHJK
1006	2,4-dimethyl-4-phenyltetrahydrofuran	82461-14-1	BDEFHJK
1007	(2R,4a'R,8a'R)-3,7'-dimethyl-3',4',4a',5',8',8a'-hexahydro-1'H-spiro[oxirane-2,2'-[1,4]methanonaphthalene]	41816-03-9	DEFHJK
1008	(Z)-6-ethylideneoctahydro-2H-5,8-methanochromene	93939-86-7	BCEFHJKL
1009	2-((S)-1-((S)-3,3-dimethylcyclohexyl)ethoxy)-2-oxoethyl propionate	236391-76-7	DFHJ
1010	Methyl 2,2-dimethyl-6-methylenecyclohexane-1-carboxylate	81752-87-6	ADHIJKL
1012	2-methyl-5-phenylpentan-1-ol	25634-93-9	DEFHJK
1016	4-methyl-2-phenyl-3,6-dihydro-2H-pyran	60335-71-9	BCEFGJK
1020	Sabinol	471-16-9	BCEFHIJKL
1021	Safrole	94-59-7	BCEFHK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
1022	2,2,7,9-tetramethylspiro(5.5)undec-8-en-1-one	502847-01-0	DHIJK
1023	3-methyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pentan-2-ol	65113-99-7	DEFHJK
1024	(Z)-2-ethyl-4-(2,2,3-trimethylcyclopent-3-en-1-yl)but-2-en-1-ol	28219-61-6	DEFHJK
1025	(E)-2-methyl-4-(2,2,3-trimethylcyclopent-3-en-1-yl)but-2-en-1-ol	28219-60-5	CHJK
1026	5-methoxyoctahydro-1H-4,7-methanoindene-2-carbaldehyde	86803-90-9	CHJK
1027	5-methoxyoctahydro-1H-4,7-methanoindene-2-carbaldehyde	193425-86-4	CHJK
1028	Sclareol	515-03-7	DEFHJ
1029	Sclareol oxide	5153-92-4	DEFHJK
1031	Selina-3,7(11)-diene	6813-21-4	DEFHJKL
1032	2-(1-(3,3-dimethylcyclohexyl)ethoxy)-2-methylpropyl cyclopropanecarboxylate	477218-42-1	DEFHJ
1033	3-(4-isobutylphenyl)-2-methylpropanal	6658-48-6	DHJK
1035	Spathulenol	6750-60-3	DEFHJK
1036	Spirambrene	533925-08-5	BCEFHJK
1037	Spirodecane	6413-26-9	BCEFGIJKL
1038	1-(spiro[4.5]dec-7-en-7-yl)pent-4-en-1-one	224031-70-3	DGJK
1042	2-(4-methylthiazol-5-yl)ethan-1-ol	137-00-8	CGIKL
1043	2-(heptan-3-yl)-1,3-dioxolane	4359-47-1	ACEFHIJKL
1045	(Z)-dodec-4-enal	21944-98-9	BDFHJK
1046	tau-Cadinol	5937-11-1	DEFHJK
1047	tau-Muurolol	19912-62-0	DEFHJK
1053	Tetrahydrojasmone	13074-63-0	BDFHIJKL
1057	2,6,10,10-tetramethyl-1-oxaspiro[4.5]dec-6-ene	36431-72-8	BDFHIJKL
1059	Thiomenthone	38462-22-5	BDEFHIJKL
1060	Thujopsene	470-40-6	BDEFGJKL
1062	Thymol methyl ether	1076-56-8	ADHIJKL
1063	1-(2,2,6-trimethylcyclohexyl)hexan-3-ol	70788-30-6	DEFHJK
1064	trans, trans-2,4-Nonadienal	5910-87-2	ACHKL
1065	trans, trans-Farnesol	106-28-5	DEFHJK
1066	trans-2, cis-6-Nonadienal	557-48-2	ACHKL
1067	trans-2-Decenal	3913-81-3	ADHKL
1070	trans-2-Nonen-1-al	18829-56-6	ADHKL
1072	trans-3, cis-6-nonadienol	56805-23-3	ACEFHK
1073	trans-4-Decen-1-al	65405-70-1	ADHKL
1075	trans-ambrettolide	51155-12-5	DGJ
1077	trans-beta-ocimene	13877-91-3	ADGIKL
1078	trans-beta-Ocimene	3779-61-1	ADGIKL
1082	trans-Geraniol	106-24-1	BCHIK
1083	trans-Hedione	2570-03-8	DFHJK
1085	7-(1,1-Dimethylethyl)-2H-1,5-benzodioxepin-3(4H)-one	195251-91-3	CEFHJ
1089	Tricyclone	68433-81-8	DEFHJK
1090	Tridecyl alcohol	112-70-9	DEFGJK
1091	Triethyl citrate	77-93-0	CEFGJ
1093	Methyl 2-((1-hydroxy-3-phenylbutyl)amino)benzoate	144761-91-1	DFHJ
1095	1-((2E,5Z,9Z)-2,6,10-trimethylcyclododeca-2,5,9-trien-1-yl)ethan-1-one	28371-99-5	DHJK
1097	Decahydro-2,6,6,7,8,8-hexamethyl-2h-indeno(4,5-b)furan	338735-71-0	BDEFHJK
1099	13-methyl oxacyclopentadec-10-en-2-one	365411-50-3	DEFHJK
1102	Undecanal	112-44-7	BDHJK
1104	(E)-4-methyldec-3-en-5-ol	81782-77-6	BDEFHIJK
1105	Valencene	4630-07-3	BDEFHJK
1107	Valerianol	20489-45-6	DEFHJK
1111	Vanillin isobutyrate	20665-85-4	CHJ
1113	Vaniwhite	5533-03-9	CGIK

TABLE 1-continued

List of materials with at least one MORV from 1 to 5

Number	Material Name	CAS Number	Comment Code
1116	(Z)-2-methyl-4-(2,6,6-trimethylcyclohex-2-en-1-yl)but-2-enal	68555-62-4	BDFHJK
1117	Methyl 2,4-dihydroxy-3,6-dimethylbenzoate	4707-47-5	CGIJ
1120	1-methoxy-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoindene	27135-90-6	ACEFHJKL
1121	Methyl (Z)-2-((3-(4-(tert-butyl)phenyl)-2-methylpropylidene)amino)benzoate	91-51-0	DFHJ
1125	(Z)-hex-3-en-1-yl isobutyrate	41519-23-7	ADEFHJKL
1126	Vertacetal	5182-36-5	BCFHJK
1129	1-((3R,3aR,7R,8aS)-3,6,8,8-tetramethyl-2,3,4,7,8,8a-hexahydro-1H-3a,7-methanoazulen-5-yl)ethan-1-one	32388-55-9	DHJK
1131	Methyl (Z)-2-(((2,4-dimethylcyclohex-3-en-1-yl)methylene)amino)benzoate	68738-99-8	DEFHJ
1135	Vetiverol	89-88-3	CEFHIJK
1136	Vetivert Acetate	117-98-6	DEFHJK
1137	Decahydro-3H-spiro[furan-2,5'-[4,7]methanoindene]	68480-11-5	DEFGJKL
1138	(2Z,6E)-nona-2,6-dienenitrile	67019-89-0	ACEFHKL
1139	(Z)-cyclooct-4-en-1-yl methyl carbonate	87731-18-8	BCHJKL
1140	(1aR,4S,4aS,7R,7aS,7bS)-1,1,4,7-tetramethyldecahydro-1H-cyclopropa[e]azulen-4-ol	552-02-3	DEFHJK
1142	3,5,5,6,7,8,8-heptamethyl-5,6,7,8-tetrahydronaphthalene-2-carbonitrile	127459-79-4	DHJ
1143	(1S,2S,3S,5R)-2,6,6-trimethylspiro[bicyclo[3.1.1]heptane-3,1'-cyclohexan]-2'-en-4'-one	133636-82-5	DEFHJK
1144	1',1',5',5'-tetramethylhexahydro-2'H,5'H-spiro[[1,3]dioxolane-2,8'-[2,4a]methanonaphthalene]	154171-76-3	DEFHJK
1145	1',1',5',5'-tetramethylhexahydro-2'H,5'H-spiro[[1,3]dioxolane-2,8'-[2,4a]methanonaphthalene] K	154171-77-4	DEFHJK
1146	4-(4-hydroxy-3-methoxyphenyl)butan-2-one	122-48-5	CEFGJ
1147	(1R,8aR)-4-isopropyl-1,6-dimethyl-1,2,3,7,8,8a-hexahydronaphthalene	41929-05-9	DEFHJKL
1148	4,5-epoxy-4,11,11-trimethyl-8-methylenebicyclo(7.2.0)undecane	1139-30-6	DEFHJK
1149	1,3,4,6,7,8alpha-hexahydro-1,1,5,5-tetramethyl-2H-2,4alpha-methanophtalen-8(5H)-one	23787-90-8	DEFHIJK

TABLE 2

List of materials with at least one MORV greater than 5 to 10

Number	Material Name	CAS Number	Comment Code
2	2,4-dimethyl-2-(5,5,8,8-tetramethyl-5,6,7,8-tetrahydronaphthalen-2-yl)-1,3-dioxolane	131812-67-4	DFHJ
23	3a,5,6,7,8,8b-hexahydro-2,2,6,6,7,8,8-heptamethyl-4H-indeno(4,5-d)-1,3-dioxole	823178-41-2	DEFHJK
141	2,4-dimethyl-4,4a,5,9b-tetrahydroindeno[1,2-d][1,3]dioxine	27606-09-3	CEFHJK
185	(1-methyl-2-((1,2,2-trimethylbicyclo[3.1.0]hexan-3-yl)methyl)cyclopropyl)methanol	198404-98-7	DEFHJK
227	Isobornylcyclohexanol	68877-29-2	DEFHJK
230	Isobornyl cyclohexanol	66072-32-0	DEFHJK
246	Indol/Hydroxycitronellal Schiff base	67801-36-9	DEFHJ
248	Hydroxymethyl isolongifolene	59056-64-3	DEFHJK

TABLE 2-continued

List of materials with at least one MORV greater than 5 to 10

Number	Material Name	CAS Number	Comment Code
343	8,8-dimethyl-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl propionate	76842-49-4	DEFHJK
359	(E)-4-((3aR,4R,7R,7aR)-1,3a,4,6,7,7a-hexahydro-5H-4,7-methanoinden-5-ylidene)-3-methylbutan-2-ol	501929-47-1	DEFHJK
565	Cedryl methyl ether	19870-74-7	BDEFHJK
631	beta-Copaene	18252-44-3	BDEFHJKL
659	2'-isopropyl-1,7,7-trimethylspiro[bicyclo[2.2.1]heptane-2,4'-[1,3]dioxane]	869292-93-3	BDEFHJK
674	(4aR,5R,7aS,9R)-2,2,5,8,8,9a-hexamethyloctahydro-4H-4a,9-methanoazuleno[5,6-d][1,3]dioxole	211299-54-6	DEFHJK
678	(3S,5aR,7aS,11aS,11bR)-3,8,8,11a-tetramethyldodecahydro-5H-3,5a-epoxynaphtho[2,1-c]oxepine	57345-19-4	DEFHJ
679	2,2,6,6,7,8,8-heptamethyldecahydro-2H-indeno[4,5-b]furan	476332-65-7	DEFHJK
715	alpha-Cedrene epoxide	13567-39-0	BDEFHJK
758	Acetoxymethyl-isolongifolene (isomers)	59056-62-1	DEFHJK
1028	Sclareol	515-03-7	DEFHJ
1097	Decahydro-2,6,6,7,8,8-hexamethyl-2h-indeno(4,5-b)furan	338735-71-0	DEFHJK

TABLE 3

List of materials with at least one MORV from 0.5 to less than 1

Number	Material Name	CAS Number	Comment Code
12	1-ethoxy-4-(tert-pentyl)cyclohexane	181258-89-9	ADEFHJK
19	(3Z)-1-(2-buten-1-yloxy)-3-hexene	888744-18-1	ADEFHJKL
20	4-(2-methoxypropan-2-yl)-1-methylcyclohex-1-ene	14576-08-0	ADHIJKL
24	O-Methyl linalool	60763-44-2	ADHIJKL
26	o-Methoxycinnamaldehyde	1504-74-1	ACHK
27	Octanal, 3,7-dimethyl-	25795-46-4	ADGIJKL
53	3,3-Dimethyl-5(2,2,3-Trimethyl-3-Cyclopenten-1yl)-4-Penten-2-ol	329925-33-9	CEFHJ
54	n-Hexyl salicylate	6259-76-3	DEFHJ
55	n-Hexyl 2-butenoate	19089-92-0	ADEFHJKL
59	Neryl Formate	2142-94-1	BCEFHJK
72	Methyl-beta-ionone	127-43-5	DHJK
73	Myroxide	28977-57-3	ADGIJKL
81	(E)-3,7-dimethylocta-4,6-dien-3-ol	18479-54-4	BCEFGIJK
84	(Z)-hex-3-en-1-yl cyclopropanecarboxylate	188570-78-7	BCEFHIKL
96	Methyl phenyl carbinyl propionate	120-45-6	BCHJK
97	Methyl phenylacetate	101-41-7	ACEFHIKL
107	2-methyl-6-oxaspiro[4.5]decan-7-one	91069-37-3	BCEFGIKL
111	Methyl geraniate	2349-14-6	BCHJKL
115	2-ethoxy-4-(methoxymethyl)phenol	5595-79-9	CFGK
116	Methyl cyclopentylideneacetate	40203-73-4	ACEFHIKL
125	Methoxymelonal	62439-41-2	ACGIJK
133	((1s,4s)-4-isopropylcyclohexyl)methanol	13828-37-0	BDEFHIJK
147	Linalyl propionate	144-39-8	BDFHJK
150	Linalyl formate	115-99-1	ACFHJK
151	Linalyl butyrate	78-36-4	BDEFHJK
154	Linalyl acetate	115-95-7	BDHJK

TABLE 3-continued

List of materials with at least one MORV from 0.5 to less than 1

Number	Material Name	CAS Number	Comment Code
157	Linalool	78-70-6	BCEFGIJK
163	(Z)-hex-3-en-1-yl methyl carbonate	67633-96-9	ACEFGKL
166	Lepidine	491-35-0	BCEFHIKL
169	L-Carvone	6485-40-1	ACGIJKL
181	Khusinil	75490-39-0	DHJK
191	Isoraldeine	1335-46-2	BDHIJK
194	Isopropylvinylcarbinol	4798-45-2	ACGIKL
198	Isopropyl 2-methylbutyrate	66576-71-4	ACEFGIJKL
201	Isopentyrate	80118-06-5	ADEFGIJKL
204	Isononyl acetate	40379-24-6	BDEFHJKL
205	Isononanol	27458-94-2	BDEFGIKL
213	Isoeugenyl acetate	93-29-8	CFHJK
214	Isoeugenol	97-54-1	CEFHIK
232	Isoborneol	124-76-5	ACEFHIJKL
237	Isoamyl octanoate	2035-99-6	DEFHJK
239	Isoamyl isobutyrate	2050-01-3	ACEFGIJKL
255	Hydrocinnamic acid	501-52-0	CEFHIK
258	Hydratopic alcohol	1123-85-9	BCEFHIK
264	Hexyl propanoate	2445-76-3	ADEFHIKL
270	Hexyl butyrate	2639-63-6	BDEFHJKL
273	Hexyl 2-methylbutanoate	10032-15-2	BDEFHJKL
275	Hexyl 2-furoate	39251-86-0	DEFHJK
282	Heptyl alcohol	111-70-6	ACEFGIKL
283	Heptyl acetate	112-06-1	ADEFHKL
284	Heptaldehyde	111-71-7	ACHIKL
287	Heliotropin	120-57-0	BCGIK
302	Geranyl nitrile	5146-66-7	BCEFHKL
306	Geranyl formate	105-86-2	BCEFHJK
308	Geranyl caprylate	51532-26-4	DEFHJ
310	Geranyl benzoate	94-48-4	DFHJ
312	Geranial	141-27-5	ACHIKL
314	N,2-dimethyl-N-phenylbutanamide	84434-18-4	BCEFHJK
319	gamma-Terpinene	99-85-4	ADEFGIJKL
346	2-(sec-butyl)cyclohexan-1-one	14765-30-1	ADFHIKL
354	3-(2-ethylphenyl)-2,2-dimethylpropanal	67634-14-4	BDHJK
355	2-(tert-butyl)cyclohexyl ethyl carbonate	67801-64-3	BDFHJK
365	2-(tert-butyl)cyclohexyl ethyl carbonate	81925-81-7	ACFHIKL
366	Fenchyl alcohol	1632-73-1	ACGIJKL
376	Eucalyptol	470-82-6	ADEFGIJKL
379	Ethyl vanillin acetate	72207-94-4	CHJ
387	Ethyl octanoate	106-32-1	BDEFHJKL
400	Ethyl cinnamate	103-36-6	BCEFHK
412	Ethyl 2-(cyclohexyl)propionate	2511-00-4	BDFHIJKL
419	d-p-8(9)-Menthen-2-one	5524-05-0	ACGIJKL
420	4-methyl-2-phenyltetrahydro-2H-pyran	94201-73-7	BDEFHJK
437	Dihydromyrcenol	18479-58-8	ADEFGIJK
438	Dihydrojasmone	1128-08-1	BCFHIJKL
439	Dihydroisophorone	873-94-9	ACEFGIJKL
440	Dihydroeugenol	2785-87-7	CEFHIJK
442	Dihydrocoumarin	119-84-6	BCGIKL
443	Dihydrocarvone	7764-50-3	ACGIJKL
447	Dihydro-alpha-terpinyl acetate	80-25-1	BDEFHIJKL
448	Dihydro-alpha-ionone	31499-72-6	BDHIJK
454	Dibenzyl ether	103-50-4	DEFHJK
455	Dibutyl o-phthalate	84-74-2	DEFHJ
469	2-pentylcyclopentan-1-one	4819-67-4	BDFHIKL
472	Decyl anthranilate	18189-07-6	DEFHJ
477	Methyl (1s,4s)-1,4-dimethylcyclohexane-1-carboxylate	23059-38-3	ADEFHIJKL
481	Cyclohexylethyl acetate	21722-83-8	BDEFHJKL
492	Creosol	93-51-6	BCHIK
495	Cosmene	460-01-5	ADEFGIKL
496	4-cyclohexyl-2-methylbutan-2-ol	83926-73-2	BDEFGIJK

TABLE 3-continued

List of materials with at least one MORV from 0.5 to less than 1

Number	Material Name	CAS Number	Comment Code
504	2-benzyl-2-methylbut-3-enenitrile	97384-48-0	BDHJK
509	Citronellyl nitrile	51566-62-2	BCEFGIKL
510	Citronellyl phenylacetate	139-70-8	DFHJ
512	Citronellyl formate	105-85-1	BCEFGJKL
515	Citronellyl benzoate	10482-77-6	DFHJ
517	Citronellol	106-22-9	BCHIJKL
518	Citronellal	106-23-0	ACHIJKL
522	Citral	5392-40-5	ACHIKL
525	cis-Pinane	6876-13-7	ADEFGIJKL
526	(Z)-3-methyl-2-(pent-2-en-1-yl)cyclopent-2-en-1-one	488-10-8	BCHIJKL
528	cis-iso-Eugenol	5912-86-7	CEFHIK
535	cis-3-Hexenyl valerate	35852-46-1	BDEFHJKL
536	cis-3-Hexenyl tiglate	67883-79-8	BDEFHJK
538	cis-3-Hexenyl propionate	33467-74-2	ACEFHIKL
540	cis-3-Hexenyl butyrate	16491-36-4	ADEFHJKL
542	cis-3-Hexen-1-ol	928-96-1	ACEFHIKL
547	cis-2-Hexenol	928-94-9	ACEFHIKL
549	Cinnamyl nitrile	4360-47-8	ACEFGIK
554	Cinnamic aldehyde	104-55-2	ACHIK
556	Cinnamyl nitrile	1885-38-7	ACEFGIK
557	Chloroxylenol	88-04-0	BCHIJK
575	Carvacrol	499-75-2	DHIJK
576	Carvone	99-49-0	ACGIJKL
579	Carbitol	111-90-0	BCEFGIK
583	Caproyl alcohol	111-27-3	ACEFGIKL
585	2-(2,2,3-trimethylcyclopent-3-en-1-yl)acetonitrile	15373-31-6	ACGIJKL
588	Camphor	76-22-2	ACEFGIJKL
602	(E)-2-methyl-4-(2,6,6-trimethylcyclohex-1-en-1-yl)but-2-enal	3155-71-3	DHJK
605	Borneol	507-70-0	ACEFHIJKL
617	beta-Pinene epoxide	6931-54-0	ACEFGIJKL
619	beta-Phellandrene	555-10-2	ADEFGIJKL
640	Benzylacetone	2550-26-7	ACEFGIK
641	Benzyl salicylate	118-58-1	DFGJ
645	Benzyl isovalerate	103-38-8	BDEFHJK
647	Benzyl isobutyrate	103-28-6	BCHJK
651	Benzyl butyrate	103-37-7	BCEFHJK
652	Benzyl alcohol	100-51-6	ACEFGIKL
662	1-(3,3-dimethylcyclohexyl)ethyl formate	25225-08-5	ADEFHIJKL
664	Anisyl acetate	104-21-2	BCEFGK
665	Anisyl formate	122-91-8	BCEFGK
667	Anethole	104-46-1	ACEFHK
672	Amyl benzoate	2049-96-9	DEFHJK
687	alpha-Terpinyl acetate	80-26-2	BDHJK
699	alpha-methyl-cyclohexanepropanol	10528-67-3	BDEFHIK
701	alpha-methyl cinnamaldehyde	101-39-3	ACHIK
703	alpha-Isomethylionone	127-51-5	BDHIJK
740	2,5-Dimethyl-4-methoxy-3(2H)-furanone	4077-47-8	ACEFGIJKL
743	Allyl phenoxyacetate	7493-74-5	BCGK
744	Allyl Phenethyl ether	14289-65-7	ACEFHK
745	Allyl heptanoate	142-19-8	ADEFHJKL
755	N-ethyl-N-(m-tolyl)propionamide	179911-08-1	CEFHJK
760	3-hydroxybutan-2-one	513-86-0	ACEFGIKL
761	Acetoanisole	100-06-1	BCEFHIK
777	6-Methylquinoline	91-62-3	BCEFHIKL
779	6,8-Diethyl-2-nonanol	70214-77-6	BDEFGIJKL
784	5-Methyl-3-heptanone	541-85-5	ACFGIKL
789	4-Vinylphenol	2628-17-3	BCHIK
796	4-hydroxy-3-methoxy-cinnamaldehyde	458-36-6	CH
797	4-Ethylguaiacol	2785-89-9	CEFHIK
799	4-Damascol	4927-36-0	BDFHJK
808	3-methyl-4-phenylpyrazole	13788-84-6	CEFHK
810	3-Methyl-1,2-cyclopentanedione	765-70-8	ACEFGIKL
811	3-Methoxy-5-methylphenol	3209-13-0	BCHIK

TABLE 3-continued

List of materials with at least one MORV from 0.5 to less than 1

Number	Material Name	CAS Number	Comment Code
812	3-Methoxy-3-Methyl Butanol	56539-66-3	ACGIKL
817	3-Hexenol	544-12-7	ACEFHIKL
819	3,7-dimethyl-2-methylene-6-octenal	22418-66-2	ADFHIJK
820	3,7-dimethyl-1-octanol	106-21-8	BDEFGIJKL
832	2-Phenylethyl acetate	103-45-7	BCEFHK
835	2-Phenethyl propionate	122-70-3	BCEFHJK
836	2-Pentylcyclopentan-1-ol	84560-00-9	DEFHIKL
838	2-nonanone propylene glycol acetal	165191-91-3	BDEFHJK
845	2-Methoxy-3-(1-methylpropyl)pyrazine	24168-70-5	BCEFGIK
846	2-isopropyl-N,2,3-trimethylbutyramide	51115-67-4	ACEFGIJK
847	2-Isopropyl-5-methyl-2-hexenal	35158-25-9	ADFGIJKL
848	2-Isopropyl-4-methylthiazole	15679-13-7	ACHIJKL
851	2-Hexen-1-ol	2305-21-7	ACEFHIKL
858	2-Butoxyethanol	111-76-2	ACEFGIKL
875	1,4-Cineole	470-67-7	ADGIJKL
880	1-(2,6,6-Trimethyl-2-cyclohexen-1-yl)-2-buten-1-one	43052-87-5	BDHIJK
882	(Z)-3-hepten-1-yl acetate	1576-78-9	ACEFHKL
883	(S)-(1R,5R)-4,6,6-trimethylbicyclo[3.1.1]hept-3-en-2-one	1196-01-6	ACEFGIJKL
888	(R)-(−)-Linalool	126-91-0	BCEFGIJK
889	(l)-Citronellal	5949-05-3	ACHIJKL
891	(d)-Citronellal	2385-77-5	ACHIJKL
899	(+)-Citronellol	1117-61-9	BCHIJKL
900	(−)-Citronellol	7540-51-4	BCHIJKL
901	(+)-alpha-Pinene	7785-70-8	ADEFGIJKL
902	(+)-Carvone	2244-16-8	ACGIJKL
903	(−)-alpha-Pinene	7785-26-4	ADEFGIJKL
904	Methyl 2-methylbutyrate	868-57-5	ACEFGIKL
909	Hexyl tiglate	16930-96-4	BDEFHJKL
918	Allyl 2-(cyclohexyloxy)acetate	68901-15-5	CHJK
921	1,5-dimethylbicyclo[3.2.1]octan-8-one oxime	75147-23-8	CFHIJK
931	alpha-acetoxystyrene	2206-94-2	ACEFHIK
940	p-Cymene	99-87-6	ADGIJKL
956	Phenethyl formate	104-62-1	ACEFHK
958	Phenethyl isobutyrate	103-48-0	DHJK
960	Phenethyl tiglate	55719-85-2	DHJK
971	Phenylethyl methacrylate	3683-12-3	DHJK
977	p-Isopropylphenylacetaldehyde	4395-92-0	BDFHK
981	1,2-dimethyl-3-(prop-1-en-2-yl)cyclopentan-1-ol	72402-00-7	BCEFGIJKL
983	p-Methoxyphenylacetone	122-84-9	BCEFHK
986	(2Z,5Z)-5,6,7-trimethylocta-2,5-dien-4-one	358331-95-0	ADHIJKL
987	p-Propyl anisole	104-45-0	ADEFHKL
994	p-t-butyl phenyl acetaldehyde	109347-45-7	BDHJK
995	p-tert-Amyl cyclohexanol	5349-51-9	BDEFHIJK
1001	Racemic alpha-Pinene	80-56-8	ADEFGIJKL
1002	4-(4-hydroxyphenyl)butan-2-one	5471-51-2	CEFGIK
1004	Rhodinol	141-25-3	BCHIJKL
1005	Ethyl (2,3,6-trimethylcyclohexyl) carbonate	93981-50-1	BDEFHJKL
1011	1-(3,3-dimethylcyclohexyl)ethyl acetate	25225-10-9	ADHIJKL
1017	S)-(+)-Linalool	126-90-9	BCEFGIJK
1018	Sabinene	3387-41-5	ADEFGIJKL
1019	Sabinene hydrate	546-79-2	ADEFGIJKL
1030	Propyl (S)-2-(tert-pentyloxy)propanoate	319002-92-1	BDEFHJK
1039	Spirolide	699-61-6	BCGIKL
1040	(Z)-5-methylheptan-3-one oxime	22457-23-4	BCEFGIJKL

TABLE 3-continued

List of materials with at least one MORV from 0.5 to less than 1

Number	Material Name	CAS Number	Comment Code
1041	1-phenylethyl acetate	93-92-5	ACEFHIK
1051	Tetrahydrogeranial	5988-91-0	ADGIJKL
1052	Tetrahydroionol	4361-23-3	BDEFHIJK
1054	Tetrahydrolinalool	78-69-3	BDEFGIJKL
1055	Tetrahydrolinalyl acetate	20780-48-7	ADEFHJKL
1058	Ethyl (1R,6S)-2,2,6-trimethylcyclohexane-1-carboxylate	22471-55-2	ADEFHIJKL
1061	Thymol	89-83-8	BDHIJK
1069	trans-2-Hexenol	928-95-0	ACEFHIKL
1071	trans-2-tert-Butylcyclohexanol	5448-22-6	ACGIJKL
1074	trans-alpha-Damascone	24720-09-0	BDHIJK
1076	trans-Anethole	4180-23-8	ACEFHK
1079	trans-Cinnamic acid	140-10-3	CEFHK
1081	trans-Dihydrocarvone	5948-04-9	ACGIJKL
1084	trans-Isoeugenol	5932-68-3	CEFHIK
1088	Trichloromethyl phenyl carbinyl acetate	90-17-5	BDEFGJ
1098	2-mercapto-2-methylpentan-1-ol	258823-39-1	ACEFHIJKL
1110	Vanillin acetate	881-68-5	CH
1112	Vanitrope	94-86-0	CEFHK
1115	2,2,5-trimethyl-5-pentylcyclopentan-1-one	65443-14-3	BDFGIJKL
1118	Veratraldehyde	120-14-9	BCGIK
1119	(1R,5R)-4,6,6-trimethylbicyclo[3.1.1]hept-3-en-2-one	18309-32-5	ACEFGIJKL
1122	Verdol	13491-79-7	ACGIJKL
1127	4-(tert-butyl)cyclohexyl acetate	10411-92-4	BDEFHJK
1128	4-(tert-butyl)cyclohexyl acetate	32210-23-4	BDEFHJK
1133	Vethymine	7193-87-5	CEFGK
1134	4-methyl-4-phenylpentan-2-yl acetate	68083-58-9	BDFHJK
1141	(Z)-1-((2-methylallyl)oxy)hex-3-ene	292605-05-1	ADEFHKL

TABLE 4

List of materials with ALL MORVs from 1 to 5

Number	Material Name	CAS Number	Comment Code
7	3-methoxy-7,7-dimethyl-10-methylenebicyclo[4.3.1]decane	216970-21-7	BDEFHJK
14	Oxyoctaline formate	65405-72-3	DFHJK
39	2,2,6,8-tetramethyl-1,2,3,4,4a,5,8,8a-octahydronaphthalen-1-ol	103614-86-4	DEFHIJK
48	Nootkatone	4674-50-4	DHJK
183	Khusimol	16223-63-5	CEFHJK
199	Isopimpinellin	482-27-9	CFGJ
206	Iso3-methylcyclopentadecan-1-one	3100-36-5	DEFGJK
212	Isoeugenyl benzyl ether	120-11-6	DFHJ
215	1-((2S,3S)-2,3,8,8-tetramethyl-1,2,3,4,5,6,7,8-octahydronaphthalen-2-yl)ethan-1-one	54464-57-2	DHJK
229	Isobornyl isobutyrate	85586-67-0	BDEFHIJK
260	2,3-dihydro-3,3-dimethyl-1H-indene-5-propanal	173445-44-8	DHJK
261	3-(3,3-dimethyl-2,3-dihydro-1H-inden-5-yl)propanal	173445-65-3	DHJK
281	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl acetate	5413-60-5	CEFGJK
329	gamma-Eudesmol	1209-71-8	DFHJK
335	4,6,6,7,8,8-hexamethyl-1,3,4,6,7,8-hexahydrocyclopenta[g]isochromene	1222-05-5	DEFHJK
353	(Z)-6-ethylideneoctahydro-2H-5,8-methanochromen-2-one	69486-14-2	CEFGJK

TABLE 4-continued

List of materials with ALL MORVs from 1 to 5

Number	Material Name	CAS Number	Comment Code
360	8,8-dimethyl-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl acetate	171102-41-3	DEFHJK
441	Octahydro-1H-4,7-methanoinden-5-yl acetate	64001-15-6	DEFHJKL
484	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl butyrate	113889-23-9	DEFHJK
487	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-5-yl isobutyrate	67634-20-2	DEFHJK
488	Curzerene	17910-09-7	DHJK
501	(E)-cycloheptadec-9-en-1-one	542-46-1	DEFGJ
566	Cedryl formate	39900-38-4	BDEFHJK
567	Cedryl acetate	77-54-3	DEFHJK
569	Cedrol	77-53-2	DEFHJK
570	5-methyl-1-(2,2,3-trimethylcyclopent-3-en-1-yl)-6-oxabicyclo[3.2.1]octane	139539-66-5	DEFHJK
573	Caryophyllene alcohol acetate	32214-91-8	DEFHJK
574	Caryolan-1-ol	472-97-9	DEFHJK
603	Bornyl isobutyrate	24717-86-0	BDEFHIJK
616	beta-Santalol	77-42-9	DEFHJK
621	beta-Patchoulline	514-51-2	BDEFGJKL
624	beta-Himachalene Oxide	57819-73-5	BDFHJK
627	(2,2-dimethoxyethyl)benzene	101-48-4	DHJK
632	beta-Cedrene	546-28-1	BDEFGJKL
663	Anisyl phenylacetate	102-17-0	DFHJ
680	2,2,6,6,7,8,8-heptamethyldecahydro-2H-indeno[4,5-b]furan	647828-16-8	ADEFHJK
684	alpha-Vetivone	15764-04-2	DHJK
694	alpha-Santalol	115-71-9	DEFHJK
696	alpha-Patchoulene	560-32-7	ADEFHJKL
708	alpha-Gurjunene	489-40-7	BDEFHJKL
712	alpha-Eudesmol	473-16-5	DEFHJK
714	alpha-Cubebene	17699-14-8	ADEFHJKL
726	alpha-Agarofuran	5956-12-7	BDEFHJK
750	Allo-aromadendrene	25246-27-9	BDEFHJKL
764	Acetarolle	744266-61-3	DFHJK
775	7-eip-alpha-Eudesmol	123123-38-6	DEFHJK
776	7-Acetyl-1,1,3,4,4,6-hexamethyltetralin	1506-02-1	DEFHJ
788	5-Cyclohexadecenone	37609-25-9	DEFGJK
804	3-Thujopsanone	25966-79-4	BDEFHJK
872	10-epi-gamma-Eudesmol	15051-81-7	DFHJK
919	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl propionate	17511-60-3	CEFHJK
927	5-Acetyl-1,1,2,3,3,6-hexamethylindan	15323-35-0	DEFHJK
933	Patchouli alcohol	5986-55-0	DEFHIJK
978	3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl pivalate	68039-44-1	DEFHJK
1007	(2R,4a'R,8a'R)-3,7'-dimethyl-3',4',4a',5',8',8a'-hexahydro-1'H-spiro[oxirane-2,2'-[1,4]methanonaphthalene]	41816-03-9	DEFHJK
1022	2,2,7,9-tetramethylspiro(5.5)undec-8-en-1-one	502847-01-0	DHIJK
1024	(Z)-2-ethyl-4-(2,2,3-trimethylcyclopent-3-en-1-yl)but-2-en-1-ol	28219-61-6	DEFHJK
1027	5-methoxyoctahydro-1H-4,7-methanoindene-2-carbaldehyde	193425-86-4	CHJK
1029	Sclareol oxide	5153-92-4	DEFHJK
1035	Spathulenol	6750-60-3	DEFHJK
1038	1-(spiro[4.5]dec-7-en-7-yl)pent-4-en-1-one	224031-70-3	DGJK
1060	Thujopsene	470-40-6	BDEFGJKL
1089	Tricyclone	68433-81-8	DEFHJK
1107	Valerianol	20489-45-6	DEFHJK
1129	1-((3R,3aR,7R,8aS)-3,6,8,8-tetramethyl-2,3,4,7,8,8a-hexahydro-1H-3a,7-methanoazulen-5-yl)ethan-1-one	32388-55-9	DHJK
1131	Methyl (Z)-2-(((2,4-dimethylcyclohex-3-en-1-yl)methylene)amino)benzoate	68738-99-8	DEFHJ

TABLE 4-continued

List of materials with ALL MORVs from 1 to 5

Number	Material Name	CAS Number	Comment Code
1136	Vetivert Acetate	117-98-6	DEFHJK
1137	Decahydro-3H-spiro[furan-2,5'-[4,7]methanoindene]	68480-11-5	DEFGJKL
1140	(1aR,4S,4aS,7R,7aS,7bS)-1,1,4,7-tetramethyldecahydro-1H-cyclopropa[e]azulen-4-ol	552-02-3	DEFHJK
1142	3,5,5,6,7,8,8-heptamethyl-5,6,7,8-tetrahydronaphthalene-2-carbonitrile	127459-79-4	DHJ
1143	(1S,2S,3S,5R)-2,6,6-trimethylspiro[bicyclo[3.1.1]heptane-3,1'-cyclohexan]-2'-en-4'-one	133636-82-5	DEFHJK
1144	1',1',5',5'-tetramethylhexahydro-2'H,5'H-spiro[[1,3]dioxolane-2,8'-[2,4a]methanonaphthalene]	154171-76-3	DEFHJK
1145	1',1',5',5'-tetramethylhexahydro-2'H,5'H-spiro[[1,3]dioxolane-2,8'-[2,4a]methanonaphthalene] K	154171-77-4	DEFHJK
1148	4,5-epoxy-4,11,11-trimethyl-8-methylenebicyclo(7.2.0)undecane	1139-30-6	DEFHJK
1149	1,3,4,6,7,8alpha-hexahydro-1,1,5,5-tetramethyl-2H-2,4alpha-methanophtalen-8(5H)-one	23787-90-8	DEFHIJK

TABLE 5

List of materials with ALL MORVs greater than 5 to 10

Number	Material Name	CAS Number	Comment Code
248	Hydroxymethyl isolongifolene	59056-64-3	BDEFHJK

TABLE 6

List of materials with ALL MORVs from 0.5 to less than 1

Number	Material Name	CAS Number	Comment Code
472	Decyl anthranilate	18189-07-6	DEFHJ
526	(Z)-3-methyl-2-(pent-2-en-1-yl)cyclopent-2-en-1-one	488-10-8	BCHIJKL

The materials in Tables 1-6 can be supplied by one or more of the following:

Firmenich Inc. of Plainsboro N.J. USA; International Flavor and Fragrance Inc. New York, N.Y. USA; Takasago Corp. Teterboro, N.J. USA; Symrise Inc. Teterboro, N.J. USA; Sigma-Aldrich/SAFC Inc. Carlsbad, Calif. USA; and Bedoukian Research Inc. Danbury, Conn. USA.

Actual MORV values for each material listed in Tables 1-6 above are as follows:

Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
1	0.548223914	0.876283261	1.22018588	−0.41901144
2	1.520311929	3.493450446	2.70657265	5.11342862
3	2.267801995	−0.81712657	0.43218875	1.595983683
4	−0.591063369	−0.48283571	0.16199804	1.210497701
7	1.437444636	2.131822996	3.81633465	1.318339345
9	2.151445882	−0.46189495	0.56090469	1.206360803
10	2.5733592	−0.58780849	1.39751471	1.258361951
11	3.052627325	1.008519135	−0.30475953	0.076323462
12	0.683776599	−0.01157903	0.82853231	0.326169402

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
13	1.549643217	1.809183231	0.70864531	2.22799611
14	2.82111224	2.339505033	1.240818	2.502429355
16	−0.31551128	−0.06816599	−0.04371934	2.76742389
17	−1.334904153	−0.5773313	1.75644798	1.898455724
18	−1.34154226	−2.63596666	0.06885109	1.001431671
19	0.15532384	0.09866097	0.64214585	−0.33330779
20	0.640261783	0.693213268	0.54637273	−0.97556029
21	0.936895364	−0.01521118	1.1697513	−0.63510809
22	1.158981042	1.115900089	−0.25859776	1.318200884
23	3.702361074	1.399942641	5.23954766	7.089933671
24	0.773874141	0.146848137	−1.05705847	−0.36193173
25	−1.016103969	−1.18967936	0.78064625	2.944710012
25	−1.016103969	−1.18967936	0.78064625	2.944710012
26	0.615085491	−0.00096877	−0.35697252	−0.18121401
27	0.70261974	−0.22197386	0.19710806	−2.37196477
28	1.366472597	−0.42546942	−0.59394241	−0.01417395
29	1.096043453	−1.02972898	−1.42167356	−0.63817943
30	1.143415203	−0.85945441	−0.41416913	2.499807942
31	1.138642907	−0.19595476	−0.54547769	−0.98828898
32	1.914414495	−0.64487788	0.63212987	1.166699371
33	0.314847366	1.848003955	−1.3905032	−0.62848261
34	−0.113542761	0.981530917	0.32824239	1.126524277
35	0.472382903	1.494882467	−0.07201236	−0.64589543
36	3.158513795	1.084094934	−0.00328981	−0.17786385
37	−1.055631982	2.240172964	0.92596118	2.105391988
38	3.158513795	0.592820874	−0.49326241	0.212867212
39	1.083800659	2.069727985	2.48170879	3.205630609
42	−0.103134861	0.267726008	−0.65350189	1.125952363
43	0.323961628	1.469295081	−0.52991193	0.797908251
47	1.703678841	1.348737095	2.00634162	−0.16505407
48	2.370955056	2.783472865	2.68240273	1.221864405
49	1.670680003	−0.41866107	−0.9173849	1.181929544
50	1.670680003	0.076369374	−0.49915943	−0.85392575
52	0.464485039	0.057512869	1.31230219	−0.11170276
53	0.626671823	−0.46954947	−0.33383736	0.277079201
54	0.666149043	0.009549925	−0.36226343	0.197224432
55	0.723473579	−1.50916383	−0.3848989	−0.71458778
57	0.381273227	1.192994109	1.65593321	−1.65739236
59	0.561360663	−0.17793966	−1.63250554	−0.7564969
61	0.146473611	−0.01535544	−0.16339658	1.738656146
62	1.20162032	−0.3576095	−0.10695443	1.322155191
63	1.084291915	2.258720158	−1.01245416	1.688283974
64	0.744770665	0.155243763	−1.8029919	1.023503542
65	0.972835178	2.797151284	1.53453579	0.857051645
67	2.069410561	0.021831924	0.37855159	−0.67235457
68	0.527636614	0.590831983	1.02843762	2.208655795
69	2.133965691	2.088998449	2.05751412	−0.9433713
70	0.327378959	0.996844599	1.23648533	−1.25138371
71	1.40093669	0.778222691	0.70401172	−0.24075444
72	0.617697349	−0.29503359	0.52404847	0.816184656
73	0.617792473	0.888976061	−0.45289639	0.615659244
74	1.437359024	1.548292147	0.10314807	−0.48982286
75	−1.970885622	3.398008325	4.08025266	−0.89948156
76	−1.32746934	−2.65365233	0.10272816	1.001614125
77	−2.541686116	3.295534192	3.75284227	0.404837808
78	−2.110794	2.109874746	3.13350902	−0.3880285
79	1.641162056	−0.28533994	1.53676145	0.652696023
80	1.594400214	0.283682865	2.23140233	1.111682021
81	0.176566806	−2.0786518	−2.13986952	0.981126964
82	0.980373758	−0.28813159	0.19404501	1.252564677
83	0.941833098	0.317310013	1.17606727	0.72992237
84	0.774237336	−0.27140727	0.72461427	−1.56415746
85	2.092976965	0.810644229	0.82999192	−0.62861806
91	2.061595915	−0.79930338	−0.18285395	−0.66898499
92	2.068748434	−0.24299896	0.07214682	−1.11758276
93	−0.08984279	−1.06025959	−0.05068694	1.560050105
96	0.927758203	−0.44129515	0.89190422	0.744284978
97	0.658667572	−0.68771072	0.46051026	−0.53120883
98	0.853222693	−0.2037738	−0.21414441	1.119784962
100	1.654535066	0.995056228	2.35139085	0.543654824
101	2.173663649	−0.11491477	1.48285148	1.698527571
102	2.066679492	−0.16785146	−0.84780149	0.12159477
103	2.335152618	−0.02866585	0.16993375	−0.98254522
104	2.760588276	0.459513599	1.35310241	0.000336976
105	1.654535066	3.654489674	3.13033965	0.544225478

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
106	1.750588169	−0.55853348	0.50257773	1.630011313
107	0.896789863	0.73615897	0.53011623	−0.54697747
108	0.532375207	0.826537134	1.21040312	0.690230716
109	2.407655187	0.742651426	1.80322099	0.271832856
110	0.54830833	2.916795026	1.40126098	0.690230716
111	0.939597126	−0.3750368	−1.23479972	−0.89366351
112	1.398518854	1.265740274	4.19618377	−0.12762692
113	1.415726941	0.086297006	3.43559555	−0.12964168
115	−1.557729423	−0.44113526	0.86330536	0.590708892
116	0.193562268	−1.58091165	0.83247813	−0.70978039
117	1.353510875	−0.59062398	−0.31776345	−0.3050158
119	0.830052725	2.28725579	0.38409695	0.219336109
120	1.261997955	−0.22622961	−1.04772194	2.028504137
122	1.505653628	−1.14748206	−0.19760084	−0.81373045
123	−0.658721962	−0.21299878	1.01439841	−0.76731016
125	0.749676998	−1.0761601	0.99563924	−1.15409002
126	0.931054384	−0.35067079	1.06050832	−1.62171794
128	−1.344832644	−0.09451199	1.19145467	1.621274257
130	1.153249538	1.605070708	2.38047907	−0.93842293
133	0.840066046	0.2323025	0.19054023	−0.26588341
134	0.522267541	0.824106618	1.83479545	0.364403434
135	2.142817887	2.142411243	−0.93830995	0.696522652
137	3.052627325	3.606270166	0.50445208	0.076323462
140	−0.153437637	0.246303216	0.76565758	1.800968868
141	2.067620311	1.424830396	2.33536931	7.644025075
142	0.98353103	1.950251373	2.50851828	−0.24499521
143	1.736969725	0.991537809	2.5691601	1.227191656
145	−0.211768579	1.46336231	−0.93580247	−1.48749449
146	1.912710035	0.926306508	1.81253333	0.494121361
147	0.675736703	0.99202385	−0.66034472	−0.66302669
148	0.757176542	1.83006252	0.16210659	0.243674851
149	0.438772371	1.091438092	−0.1560319	−0.61711642
150	0.84399938	0.675302022	−1.69771411	−0.73841711
151	0.633570539	0.988413715	−0.54991825	−0.43550324
152	0.911582356	1.974700218	−0.92267786	0.628660087
153	0.319053885	2.531735341	−0.39139184	0.734629224
154	0.714814512	0.690769753	−2.06588692	−0.73356628
155	−0.161798388	0.032135767	−0.13802086	1.734928461
156	−0.571799976	−1.32834264	−1.65346017	1.856689553
157	0.131224024	0.21510779	−1.70996346	0.964902175
158	1.201616145	−0.21158932	−0.8501176	−0.33330779
159	0.811289908	1.606645397	0.25352447	−1.83775117
159	0.811289908	1.606645397	0.25352447	−1.83775117
161	0.475184006	1.99305646	1.90910177	3.288337059
162	0.833030517	0.487189028	1.76798642	0.104378164
163	0.58993703	−0.46431772	0.74883588	−0.81090824
166	−0.121286831	−0.84664528	−0.32625341	0.778055656
167	0.846400186	−0.25922232	0.69248774	1.183696217
168	−0.310930833	−0.81048493	0.08527131	1.61831109
169	−0.2346025	0.890438419	−0.13206526	−0.83961838
170	−0.169223695	1.172917966	−0.11306441	0.099121666
174	2.863652137	0.236674094	−0.69038707	1.610215283
175	1.789769228	−0.31740428	−0.89529921	−0.09686469
176	2.625947334	0.083548191	0.30634559	−0.35925728
177	1.674319352	−0.22179044	0.42093738	−0.23683577
178	2.863652137	0.727069168	−0.26724686	−0.44888613
179	0.070511885	0.365852864	1.35327505	−0.03748038
181	0.976254543	0.691638796	0.51371978	−0.02503945
182	−1.842503751	−0.12688474	2.56277877	0.111744488
183	3.195758563	3.886545621	4.29482769	3.829845293
184	0.333889534	−0.67236766	2.21605977	4.254612125
185	5.61162203	1.40458529	2.86231343	1.035135749
186	1.068190511	−0.65969343	−0.63104765	−1.36962992
187	1.396358739	0.249705611	0.81449499	−0.15353102
189	1.544466636	−0.33742685	0.8096674	−0.44483677
190	−0.210918777	−1.04086063	0.02614862	3.362615492
191	0.715897301	0.666316436	−0.41719538	0.400723176
192	0.65612864	1.231196814	0.75462061	1.514581532
193	−0.394884432	1.129269425	−0.3157071	−0.61478944
194	−2.111794245	−0.71010521	0.53077207	0.59302222
195	1.18880856	0.704463775	1.99312777	1.419709023
196	1.885714606	0.436434665	1.44657532	1.145809063
197	2.174580668	0.133070149	0.99814905	0.871658496
198	−0.533922573	−2.16213117	0.5812107	−0.92280453
199	1.493919434	1.45125612	1.95141371	4.403441058

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
201	−0.005520296	−0.83362523	0.65480762	−0.38894276
204	0.732981164	−0.97494758	−0.91192246	−1.00034323
205	0.991838899	−0.60053505	−0.49983634	0.674468753
206	2.147983695	1.291351958	1.64553247	1.626455601
208	−0.386224123	−0.24799559	1.19406353	−1.61243489
209	1.447075297	0.122626462	1.08021156	0.473154634
210	−0.386224123	−0.24799559	1.19406353	−1.61243489
211	2.186118467	1.873949371	0.64852028	−0.59205851
212	1.367811201	1.689658923	1.8017376	2.525531645
213	0.925016223	0.875610609	0.31462609	0.847028648
214	−0.239873321	1.808823425	−0.36105512	−0.07650286
215	2.264275088	1.360001278	3.25759951	2.147928282
218	−0.509585598	−0.93428643	1.63030386	−0.79436377
221	1.876297063	0.026873469	0.45442758	1.538486988
227	5.317676982	2.824566654	1.73360625	3.103310061
228	3.323728685	1.554268023	1.8883835	0.957527434
229	3.218950175	1.464118271	2.47512497	1.214429025
230	5.242356467	3.482206715	3.50441556	1.614847073
230	5.242356467	3.482206715	3.50441556	1.614847073
231	2.710087358	1.517756148	0.35088855	0.603171932
231	2.710087358	1.517756148	0.35088855	0.603171932
232	0.703604481	0.42129186	0.39567696	0.41729786
233	1.312921486	0.816597603	2.17066283	0.472801294
234	0.874145958	0.741410502	1.71105733	−0.47289415
237	0.778921491	−1.02119303	0.4612164	−0.8881184
238	0.681403734	−0.342052	1.27750286	−0.3383341
239	−0.870637933	−2.58292907	0.79173772	−1.27888846
242	0.910211214	0.374558101	1.01712685	1.001043471
243	1.670680003	0.104780951	−0.6545574	−0.46985154
244	1.140332181	0.116513028	1.61110902	3.713305291
246	−0.634992987	0.548746912	4.62542427	7.660969857
247	−1.739729444	−0.91508372	1.18693162	3.108631198
248	5.81821686	6.320330665	6.14379552	5.214046447
249	0.348188924	−0.95333461	−0.08432225	1.866717393
252	2.456287983	−0.02516176	0.76814124	1.756087132
253	1.76915226	0.226389981	−0.18115009	−0.62385199
254	0.658956861	−0.39322197	−0.67153044	1.416053304
255	0.892122738	−0.46985097	0.42813903	−0.46752753
256	0.625043963	−0.65111806	1.4319541	2.110656697
258	−0.187789327	−0.85870492	−0.21766971	0.931521178
259	−1.261365139	−2.33099427	1.33595129	0.43644676
260	2.4020693	2.669351733	2.36395771	1.910609499
261	1.978618006	2.732613301	2.19594212	1.683156477
263	1.350274014	−0.59210334	0.14780643	−0.13113746
264	0.526085484	−1.54983116	−0.17497208	−0.8204696
267	1.175997006	−1.03507906	−0.11004734	−0.50564806
269	2.367197222	0.457286256	0.02211231	0.497925297
270	0.711734628	−1.45058685	−0.17018094	−0.71795736
271	1.073564668	−0.47951936	−0.80269361	0.136837431
273	0.663835001	−1.5674675	0.28509522	−1.12959038
274	1.628173498	−0.58892922	−0.3892777	−0.66728139
275	0.935336765	−0.9522644	−0.87000279	−0.29365972
276	−5.989155804	1.722071272	3.31094703	1.273171428
277	0.904631703	−1.02628534	0.49274649	1.000655271
278	0.293923493	−0.82335619	0.13147975	2.730914048
280	−0.284822555	0.322094188	3.2184015	0.383213731
281	2.201373139	2.228820089	2.03455575	1.720697243
282	0.505189899	−1.01844885	−0.98499144	0.912195522
283	0.775002479	−1.29876341	−1.52162214	−0.77292581
284	0.505189899	−0.57830662	−0.55673047	−1.09870665
285	−0.987611415	0.908212704	2.59089199	1.311154128
286	−2.635687733	−1.53554173	0.68132558	4.350511118
287	−1.890800496	−0.9175912	−0.84177071	0.615422874
288	−0.417807714	−0.27643667	1.06515025	0.958812195
289	1.078763544	0.263281029	1.00763749	0.866949263
290	0.733561298	−0.47493387	0.17088582	1.536463653
292	1.2252731	0.720498276	4.33362953	2.202084022
293	0.947860369	0.93449449	1.85056304	0.355024738
294	−1.051634009	0.136579632	2.17918871	−0.01949057
295	1.039790111	0.81471915	−0.94326824	0.887662055
296	1.009509413	1.364418947	1.42805339	0.429992055
300	0.246930208	1.113809101	0.25540773	0.528760053
301	0.246930208	1.113809101	0.25540773	0.528760053
302	0.697198045	−0.41500676	−2.35076003	−0.60639529
303	0.10667178	3.580489288	0.25893587	2.329367856

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
306	0.561360663	−0.17793966	−1.63250554	−0.7564969
307	1.583243229	1.398558046	0.152423	−0.13988304
308	−0.067380931	0.74278658	0.29217479	0.180866298
310	0.238202662	0.926241567	−0.66649303	0.508184193
312	0.714965519	−0.45511207	−2.34849436	−0.9953911
314	0.736369931	−0.52068396	0.53882253	−0.7059813
316	2.314558863	−0.25458611	0.22080129	−0.04142716
317	1.095005005	0.057439852	−1.20728654	0.035895107
318	−0.111714595	−0.61079351	−1.16010053	1.102488007
319	−0.264829849	0.540388888	0.10729709	−0.57215449
321	1.243861203	−0.75229123	0.05515858	−0.34659253
322	0.956379568	2.838565742	2.7997689	0.805938034
323	1.884902746	0.813499245	0.86344403	−0.1241887
324	0.189037208	1.105600415	0.48460989	0.285938173
325	0.791400443	2.454239197	1.54315324	1.416449646
328	1.22836182	2.190068443	2.48751772	0.126982574
329	1.800767509	1.372656013	2.09551175	2.849728342
330	2.688999059	0.017422444	0.34929031	0.108155361
331	−0.223648429	0.873635097	1.78683863	0.126324441
332	1.884902746	−0.46695445	0.1761545	−0.11026722
333	0.956379568	2.838565742	2.7997689	0.805938034
334	0.569368001	2.811464091	1.88866785	−0.16122533
335	1.931053264	2.306571877	4.45651797	4.474221307
336	1.355107839	−0.49142588	0.83879083	0.18350392
338	1.025467157	−0.99345477	0.57780149	−0.19101275
339	1.216559787	−0.68632827	0.71921804	0.140021721
342	2.073599715	−0.19777074	−0.44964804	−0.71885866
343	3.375840967	3.294907583	5.0378352	4.14804591
344	0.926453735	1.336260845	2.20088072	0.226359561
346	−0.133453942	−0.27276578	0.95852923	−0.88404805
347	−0.414858428	−0.94736055	1.9452074	−1.32753709
349	0.011110326	0.415952358	1.08076289	2.638925816
350	−1.366284701	−1.3912958	−0.0683659	1.205395618
352	2.592229701	2.014162407	−0.56599991	−0.19676404
353	2.347680291	1.432589328	3.81650185	2.28664738
354	−0.094599823	0.704257624	0.8494127	−0.05632553
355	−0.534528735	−0.26820008	0.69328667	0.63557685
356	0.71431796	0.568464069	1.14931631	0.32594963
358	1.637857828	1.932629993	0.68535871	−1.06298922
359	3.169264285	2.326146291	5.44251947	3.621423972
360	2.824830639	3.29829616	3.43870859	3.771256974
361	0.772183137	0.62924397	1.14549597	0.743423792
362	2.158106604	−0.08901432	0.85035629	−0.37323677
363	1.485114303	−0.85819594	0.70929196	4.132013298
364	−0.661168364	−0.30270875	2.49237859	−0.7675819
365	−0.518303431	−2.08665423	0.5658944	−1.10451499
366	−0.501301831	0.561788544	0.14113617	0.610082057
368	−0.106125097	1.092782715	−0.89571841	−0.08594454
369	1.43532227	1.656262941	−1.09448841	1.674272267
370	1.064083705	−1.08482967	0.35640283	0.866246621
371	1.933819902	0.975863726	1.62799441	1.492919426
372	1.933819902	0.975863726	1.62799441	1.492919426
373	0.274120553	2.246646022	2.93946992	2.617412085
374	0.940949346	2.935858163	0.52084392	0.847114052
375	0.177236108	2.745061961	0.76268843	0.373809692
376	−0.999571921	0.579320229	−0.06019938	−0.94280945
377	0.521811983	−0.8476641	0.7732327	1.729406547
378	−0.532701772	−2.17823188	1.26760147	0.815211357
379	−0.684994963	0.018353057	−0.8170018	0.582030709
381	1.592237677	1.373054134	0.60184939	−0.30300485
385	0.967501839	0.136172137	1.3645564	0.374341215
385	0.967501839	0.136172137	1.3645564	0.374341215
386	1.247138794	−0.97883463	0.03688288	−0.57321578
387	0.785485559	−1.23629818	−0.07759084	−0.71795736
388	1.503632155	−0.13455265	0.86630165	0.102845335
388	1.503632155	−0.13455265	0.86630165	0.102845335
390	0.811363694	0.872605919	−0.17445198	1.358866557
391	1.653006495	−0.44095837	0.46475017	−0.16817306
394	1.043989895	−0.82625074	0.40893134	−0.10417542
397	1.430046723	−0.79407262	0.15684862	−0.4384694
398	−1.401723491	0.271079592	1.35530191	−0.63550333
400	0.762211626	−1.06778628	−0.93642574	−0.13193338
407	0.591198428	−0.8943503	1.41392426	2.694863328
412	−0.067309295	−0.21963004	0.57788677	−1.22740398
413	0.630456164	1.538096427	2.10994563	2.45668637

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
414	0.460631327	3.678501689	1.18326431	1.28320952
415	0.060485009	−1.37776759	−0.22689728	2.328813337
416	1.864088631	0.2451067	1.63260125	1.855346924
417	−0.747017264	−2.60335412	0.85092701	3.525229717
418	3.678359573	3.437930194	4.42449746	0.716864637
419	−0.131519393	0.731836014	0.81604919	−1.29993979
420	0.11276779	−0.13029453	0.19422843	0.853490939
421	2.819997124	0.193567405	1.15903162	1.748390255
424	−0.211768579	1.46336231	−0.93580247	−1.48749449
425	−1.467980751	−2.41196874	−0.34454968	2.161517022
426	2.176374648	2.131594325	1.99252316	0.002774099
428	2.10568799	0.336366154	−1.41176883	0.827982605
429	2.179080731	0.811454228	−0.58304782	0.827982605
432	0.814675557	−0.13076033	1.07380397	−0.01560954
436	0.003614069	−0.4704298	1.6004974	−1.27605297
437	−0.070955783	−0.17246926	0.32599434	0.682083059
438	0.71141055	−0.62729405	0.6220964	0.498836975
439	−2.152188932	−1.81662702	0.66042162	−1.57001886
440	0.194444196	0.880854446	0.80016905	0.373809692
441	2.349282571	1.734747324	1.71148239	1.274963632
442	0.243841724	0.036287037	0.51243015	0.361825534
443	−0.131519393	0.731836014	0.81604919	−1.29993979
444	0.607958335	1.910541857	−0.42710132	−0.46909656
445	−0.047486491	1.045012945	−0.25220201	−0.31982826
447	0.611981677	0.559261438	−0.31210071	−2.20421695
448	0.45491409	0.804084437	0.03088748	−0.17549737
449	0.323968221	−1.00428076	−1.65151616	1.031096548
450	1.433196296	−0.12277841	3.46809784	−0.14760118
453	1.138642907	0.238344138	−0.56453732	−0.60639529
454	0.689556954	−0.32116049	0.17614165	0.99165159
455	−0.978653338	−0.96381951	0.37950282	0.793341469
457	2.740852074	1.146976436	0.01429902	0.909817098
459	2.034203389	−0.06483391	0.25864307	0.096715771
461	0.405441454	3.029508918	1.66201629	0.621375526
462	1.348588872	2.252065606	1.98535615	0.126982574
463	2.402548765	0.141297665	0.32401564	0.165555831
464	1.396358739	−0.35292634	0.11760582	−0.13960954
465	0.940569103	1.267891616	1.68420132	1.263608034
466	−0.191220659	0.067062979	2.24237992	0.125280183
467	0.940569103	1.267891616	1.68420132	1.263608034
468	0.123370943	1.164309475	0.17099727	−0.95446701
469	0.925252053	−0.57178441	0.69807561	−0.59133195
470	2.237616041	1.810156128	−0.58140154	1.320304914
471	1.714516544	−0.62135116	0.23636624	−0.2706853
472	0.605628283	0.938001104	0.50028363	0.743911872
473	0.093847515	−1.1973016	−0.26960381	1.829684619
474	0.696773849	1.065592689	0.37607733	−0.19214193
475	1.405352842	0.379589036	0.27781476	0.041425889
477	0.237582954	0.629327199	0.45159895	−1.59912382
478	1.360648836	0.598053217	2.00883441	−0.0827715
479	2.214928637	−0.24358938	−0.3486103	0.9190125
480	1.933819902	−0.3826187	0.97439148	1.491603428
480	1.933819902	−0.3826187	0.97439148	1.491603428
481	0.612364301	−0.26364231	−1.3201026	−1.62884377
482	1.604448424	1.286308964	−0.34289284	0.887781648
482	1.604448424	1.286308964	−0.34289284	0.887781648
484	3.269313083	2.336715633	3.65534824	2.158890088
486	1.530484593	1.052491466	3.11297562	0.430146348
487	2.889323404	2.226094104	4.12877599	2.184426542
488	1.062548487	4.75312035	2.78435853	2.01925207
491	0.397432667	−0.20071274	0.842202	1.944142408
493	0.270731661	−0.7406408	−1.17192239	1.401933582
495	0.298981649	0.854414067	−2.2714622	−0.62848261
496	0.565278409	0.659352661	−0.00159534	0.384991859
497	2.972647554	1.210988046	0.08629653	0.991649406
498	2.863652137	0.229707592	−0.75515466	−0.06022029
502	0.478208715	1.827989577	0.67676345	−0.88328385
503	0.845706083	1.117392544	−0.21773539	0.272770415
504	0.837488879	0.874463134	−0.08311625	0.149327397
505	1.749446006	0.076054765	−0.59137073	0.291488011
509	0.716903285	−0.22917288	−1.93027881	−1.52173529
510	0.241638743	0.769444787	−0.07283731	−0.38771737
512	0.556069536	−0.47514685	−1.88388474	−1.67297277
515	0.23291131	0.598998195	−0.99553291	−0.40829542
517	0.784181146	−0.20530019	−1.89414748	0.152726109

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
518	0.742030255	0.281479436	−1.4156326	−1.91369695
519	0.367442761	−0.50911405	−0.77651804	3.081125259
520	1.28335174	−0.16976166	0.19676128	1.493753388
521	−1.105672292	−1.29204085	−0.95149628	1.817322011
522	0.714965519	−0.45511207	−2.34849436	−0.9953911
524	0.325255266	1.131242708	−2.79377204	−0.62848261
525	−0.210625832	0.979060885	0.37926876	−2.08002977
526	0.698504484	0.548193178	0.92265651	0.500152973
527	0.420012766	1.731459464	−0.23341719	0.139565409
528	0.161304111	0.66712144	0.58401752	0.373809692
529	0.911890585	0.353572744	1.04706167	1.001090055
530	1.670680003	0.86138741	−0.27652639	1.174059185
531	−0.169223695	1.172917966	−0.11306441	0.099121666
532	2.237616041	1.438074134	0.31117554	−0.71786492
534	1.205873658	1.32208026	1.21816392	−0.5027271
535	0.999469738	0.056406435	0.72382479	−0.61170287
536	0.63876931	−0.39111525	0.08747854	−0.66833729
537	0.689953348	1.206425159	0.58870271	0.198159994
538	0.54988634	−0.32842011	0.69258273	−0.81953404
540	0.735538933	−0.20826876	0.6955468	−0.7170218
541	1.097368973	0.740159871	0.12012053	0.137772993
542	−0.24632881	−0.09354384	−0.13580399	0.599029186
544	0.687639306	−0.30861817	1.14537443	−1.12865481
546	1.670680003	1.94609957	0.19633838	1.14825764
547	−0.24632881	−0.23975349	−0.01449288	0.574861147
548	1.349418105	−0.29885837	0.42849141	0.008671721
549	0.623933699	−0.62776258	−1.2835205	−0.23131507
550	1.091300413	−0.33969057	0.91994098	0.043900994
550	1.091300413	−0.33969057	0.91994098	0.043900994
551	1.172668936	−0.39476924	−0.61394794	−0.16425167
552	1.434150355	1.041294025	0.32000606	1.24279868
553	1.040907688	−0.38050079	−0.95306497	−0.03036668
554	0.623933699	−0.65991007	−1.27562979	−0.61529805
555	0.623933699	−0.09654208	−0.6432411	1.36608372
556	0.623933699	−0.62776258	−1.2835205	−0.23131507
557	−1.043779684	0.358151507	0.96578333	−0.7498558
558	3.113548387	0.901949497	−0.07402944	2.171129217
559	1.433732801	2.854621121	1.81079379	0.893806123
560	0.793851811	0.195900744	1.13222828	−0.38432626
561	1.874725149	0.921395625	3.05642524	2.616508159
562	−1.30410643	−2.63450231	0.12574616	1.001870337
563	−0.153585698	2.733591064	2.12854196	3.424603045
565	3.655479783	3.751479035	5.51820797	3.282822615
566	4.034374094	3.755759834	4.82506006	3.190861648
567	4.203811008	3.627632534	4.68751919	3.372829008
568	1.643514525	0.827299302	0.70706274	2.545428997
569	2.692371513	3.589810155	4.40390088	4.506937878
570	1.707556133	2.400065573	1.78745169	2.655458557
571	1.862893827	2.803280605	0.98209954	3.188564781
572	1.203581368	0.798608763	2.67898788	1.659633314
573	2.459623568	2.656773866	3.54771795	2.085649266
574	2.878405284	1.770500246	4.00464111	4.859737959
575	−0.395731956	0.325594009	0.98982713	−0.25791379
576	−0.2346025	0.890438549	−0.13206526	−0.83961838
577	0.484934913	2.001798597	−0.11430063	−0.05230593
578	1.138642907	−0.72228381	−1.0321	−0.60639529
579	−2.722013313	−3.79238321	−1.13572295	0.953543134
580	1.138642907	−0.66601616	−0.95089973	1.036450105
581	1.105119249	−0.82090309	−0.06184517	−0.90904158
582	2.092976965	−0.31228784	0.08755137	−0.62955362
583	−0.24632881	−1.33540368	−0.96483147	0.624830731
584	2.237616041	0.30800753	−0.44296441	−0.71918014
585	0.634021669	−0.28724544	−0.74527157	−1.361765
586	1.313957377	0.449601	1.50810166	−0.30998322
587	0.304876136	−0.43283205	1.23096012	0.398961811
588	0.449793066	0.007950225	0.8004147	−0.63434071
589	−0.681766404	1.08547116	0.54331319	−2.16710754
591	−0.34676031	−0.77573166	1.85884084	0.312272735
592	−1.573190219	2.29028194	1.86285367	0.687279186
594	−1.45374647	0.452156392	2.48970747	0.858468114
595	0.058003677	−1.91126878	1.52586392	−0.07528071
599	1.485777974	1.54384772	0.79002365	−0.09069773
600	1.914093549	0.841364523	0.15173954	0.255445859
601	1.203870517	1.17864533	1.22686262	0.453935114
602	0.771984982	0.66859171	−0.37427136	0.07599515

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
603	3.218950175	1.464118271	2.47512497	1.214429025
604	2.710087358	1.517756148	0.35088855	0.603171932
605	0.703615734	0.42129186	0.39567696	0.41729786
606	0.055463315	1.972687323	3.42898264	1.395457482
607	−0.146397553	−2.05649732	0.17598641	1.900931587
608	1.473771668	2.08260463	−1.09319437	0.44289209
609	−0.466215117	0.845009196	1.89800228	0.840292062
610	2.14236439	1.079695535	0.29060257	1.329215628
611	1.078583502	1.707732184	−0.73721672	−0.87923138
612	−0.128136098	1.038320983	−0.63703066	0.184527669
613	1.599427115	3.615521066	0.43343413	−0.1515479
614	1.489603514	2.706865637	−0.06242639	−0.47244791
615	1.960664614	4.490550162	2.26962278	0.346542121
616	2.689328335	3.692579375	2.01499213	1.348800283
617	−0.845027889	0.504788036	0.4957383	−0.65628324
618	−0.461016335	1.612995126	1.09551709	−1.62235977
619	−0.222804396	0.361727974	0.62743416	−1.02982449
620	0.745610019	−0.76737462	−0.67364137	1.696394301
621	3.671429366	1.708460032	4.57083156	1.955988764
624	2.139270802	2.093130621	2.5533383	3.30383102
625	0.665423108	1.356936283	1.5515704	1.874119646
626	1.292942787	0.621140137	2.28513785	1.042322574
627	1.14724223	−0.51104438	1.01088446	1.51232276
628	1.44418619	3.825155203	−0.84341678	−0.02251455
631	2.622138509	5.106659136	4.48303003	2.115425367
632	2.450328692	4.670297017	4.54579766	2.15781135
633	1.560465308	2.636096631	2.45546606	0.920962489
635	1.510161132	2.388971583	−0.63579931	1.939575919
636	1.433842763	0.529693203	−0.23195491	1.22356734
638	1.921725015	0.758255259	0.81570609	3.615611357
639	0.422001837	−0.14885323	−0.00660617	1.726576493
640	0.865825265	−0.28827025	−0.54129473	0.283616979
641	0.813978315	0.509726232	0.37457254	0.842075065
644	0.85173251	0.664325682	1.88299246	0.951603698
645	0.417907652	−1.00347186	0.9667556	−0.47157656
647	0.221569324	−1.2239438	0.91464498	−0.19166679
649	−0.560315649	−0.67419393	−0.02482011	1.492767049
650	1.640396187	0.328871961	0.04729888	0.912259803
651	0.672555558	−0.9987845	0.48545476	−0.13530683
652	−0.995969271	−1.38653208	−0.49268035	0.944524468
653	1.203949791	0.0153333	−0.10401424	0.73323846
655	1.334772083	0.418728831	−0.92221842	1.317365259
658	0.414934548	0.314990682	2.78051829	2.656854539
659	3.996948911	1.915319951	3.03990612	5.764113617
660	2.175041013	1.882945358	0.07779745	−0.18323732
661	−0.316755016	1.64607349	2.76327471	2.024910676
662	0.258228842	0.844792644	0.1924797	0.098776211
663	1.521826905	1.097809988	2.13583044	1.30609234
664	0.708920214	−0.27795513	0.15395433	0.014791904
665	0.630772742	−0.34278374	0.49097281	−0.0565644
667	0.812238101	0.195908668	0.21564664	0.219336109
668	1.529097453	2.246515706	1.4678099	−0.81836944
671	1.453855457	−0.51177209	−0.78608937	0.361715513
672	0.771613806	−0.81209599	−0.85297613	0.084880782
673	1.874725149	0.921395625	3.05642524	2.616508159
674	5.912391366	3.468705262	6.81994671	7.217631788
675	0.525794155	0.473286101	2.51749677	2.935001452
676	0.623704257	1.523736626	2.50208859	2.474137331
677	−0.548848405	0.058004962	1.07849806	2.361730638
678	4.818555677	1.506257638	4.96635528	5.508133385
679	4.332202737	2.699343437	5.65576391	5.021298111
680	4.042984412	4.75506829	4.65903898	4.913020939
681	0.5959536	2.091803965	−0.14697928	−0.71889234
683	0.87899671	0.043210589	1.37554648	−0.60198897
684	2.349844428	1.181400632	2.15359469	2.136987013
686	1.024635336	1.040500794	0.9820242	−1.16405004
687	0.551495677	0.66297128	−0.45433071	−1.28827912
691	1.609835015	2.898881191	−0.99203246	−0.15162554
692	2.002379485	3.95875961	1.1705779	0.346542121
693	4.264631423	4.375626605	0.93418004	0.114988571
693	4.264631423	4.375626605	0.93418004	0.114988571
694	4.858313721	4.772826468	3.58732214	2.558402204
696	2.99409154	3.843066736	2.50597637	1.205022789
697	0.407534444	2.829113684	2.16548165	0.756766079
698	0.983060431	2.328872529	1.67788951	0.805938034

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
699	0.996500165	0.60129571	−0.27496491	−0.22179967
700	0.698400489	0.514637899	1.14265307	0.816064314
701	0.592372435	−0.67812322	−1.75051912	−0.51109618
702	−0.211768579	1.46336231	−0.93580247	−1.48749449
703	0.372029303	0.866016277	−0.91679974	0.347054507
704	1.187861135	0.858978871	0.1265005	0.217668671
706	0.193569186	1.623921627	0.08867618	0.808617424
707	0.819562098	3.57840156	3.38080377	1.26599216
708	2.391828225	1.877690145	3.85935427	1.647356195
709	1.280902077	2.17019575	3.40315777	0.126982574
710	1.454593977	3.128186882	−2.26368122	−0.02251455
711	−0.783387499	1.465620573	1.22912535	−1.41213701
712	1.936489942	2.528373237	2.13424487	2.393940425
713	1.303999908	2.146563611	−0.26420591	−0.01477791
714	2.3584433	3.778880151	3.4396901	1.593719007
715	4.023918591	3.403899942	5.07447567	4.880181625
716	0.981194248	1.73892162	2.21166953	2.738129365
717	0.983060431	2.328872529	1.67788951	0.805938034
718	1.241840746	3.430871861	0.55000978	1.073616332
719	1.483275952	3.037398628	−1.55547275	−0.47244791
720	2.372311412	3.403234423	−0.21191089	−0.08519829
721	2.128185431	0.274654772	0.47626043	2.465333527
722	0.616377169	−0.58753328	0.48821573	1.063402884
723	−1.273274319	−1.12897478	1.71118519	4.067480158
724	2.103515193	0.165377929	−0.18223896	0.288303217
725	0.983060431	2.328872529	1.67788951	0.805938034
726	2.887615733	3.282342953	1.95034945	2.462290186
727	2.241052707	2.13951389	0.36814978	0.371689426
730	1.121105724	−0.20397307	−0.15741334	0.897609916
731	1.437838545	−0.09620743	0.02756967	1.949139525
733	−0.46922259	1.067777032	1.61226345	0.185415155
735	−0.081273581	1.192925027	1.67970188	0.33874614
736	−0.13000788	1.099012031	1.64139691	0.248287146
738	1.670680003	−0.20756775	−0.73755051	−0.84924056
740	−1.532691904	−2.55214711	0.57438104	0.555698696
741	1.407504561	0.048284736	1.01405149	−2.2579901
742	0.644803847	0.644647752	1.35192052	−0.62780087
743	0.174679072	0.169515693	0.62350977	−0.08144308
744	0.02068385	0.648730454	−0.04946215	0.214634634
745	0.741424752	0.523647641	0.52863925	−0.65426285
746	1.285306965	1.929408375	0.85560877	−1.4619958
748	−1.513804897	−1.10823383	1.09397284	−0.88975989
750	2.554017714	3.544542579	4.42317523	1.647356195
752	2.592229701	1.158945916	0.24149847	−0.58379051
754	1.649506181	1.31981993	2.36997533	0.406081966
755	−0.028552173	0.253838465	0.95694896	−0.16565786
757	1.446915042	0.673406021	−0.6641103	−1.80002119
758	5.933043009	5.716461604	6.67410554	4.433272782
760	−3.195604514	−2.60998376	−0.11222221	0.792186468
761	0.286783044	−0.52414055	−0.57593161	0.628896611
763	1.405567948	−0.84372738	−1.32379279	−0.50314577
766	0.279442569	−1.00722191	−0.18524031	2.487147765
767	−1.32777782	−2.36136561	−0.79602501	1.247063893
768	−0.692560954	−1.92177717	0.46687554	2.400762497
769	1.889999468	1.112266205	0.82815523	0.525271623
770	2.237616041	2.282141767	−0.149966	−0.71866539
771	0.909356011	0.368597887	1.03689838	1.001198751
772	1.328601831	0.715296776	0.20358825	1.147403521
774	2.002379485	3.95875961	1.1705779	0.346542121
775	1.936489942	2.528373237	2.13424487	2.393940425
776	1.495019673	4.35984375	2.59969954	2.95313487
777	0.206892499	−0.57813502	−0.32983	0.781221286
778	1.340232187	−0.11034804	0.35759778	1.690582999
779	0.595257521	−0.85639987	0.19436224	−0.73333902
781	2.187955186	2.571774369	2.74817529	−0.52827851
782	0.893855657	0.63313304	1.19104388	−1.61620514
784	−0.275919571	−1.64491584	0.60429762	−1.5580623
786	−0.043537347	1.337721065	−0.56551398	−0.02167052
788	2.147983695	1.250042565	1.72576392	1.626956379
789	−0.624451013	0.76248127	−0.79219481	−0.73513092
791	0.227060873	−0.04783658	−0.16862915	1.166609659
792	0.90746622	1.643598677	0.26467094	0.396081003
796	0.811374104	0.766579899	0.10161642	0.135186519
797	−0.185638022	0.53853264	0.65441562	−0.25681926
799	0.657769581	0.095543194	0.89522656	0.558428618

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
800	0.227060873	−0.04783658	−0.16862915	1.166609659
802	−0.660595577	1.597474466	1.49106895	−0.20429128
803	1.706162052	0.623892414	0.59662073	0.7745661
804	3.478490379	2.348697011	3.96279011	2.456963386
805	0.377241729	0.83329773	0.1712741	1.057125999
806	2.863652137	0.771287371	−0.4183972	−0.44551461
807	1.794279084	0.711717977	0.35187068	−1.0208486
808	0.408210632	0.633556897	−0.37022584	0.717270748
810	−2.506277966	−2.61703099	0.87880054	−0.72832121
811	−0.789075789	−0.15346024	0.64720487	−0.48507671
812	−1.395132583	−2.59063834	0.14973761	0.623759794
814	0.414608216	−0.23108581	1.15081653	−1.10351559
817	−0.24632881	−0.09354384	−0.13580399	0.599029186
819	0.805916178	0.96701754	−0.8811308	−1.23858491
820	0.744770665	−0.73855596	−0.2249849	−0.2981968
821	1.099377934	−0.55297074	−0.58846144	−1.64325365
824	−0.183625049	1.183962609	1.63494269	0.25504959
826	1.678825829	1.234136613	1.45948258	0.224375571
827	2.592229701	0.621958527	−0.52522117	−0.19676404
828	2.592229701	0.57915141	−0.51767373	−0.58077497
829	1.670680003	1.284791367	0.14864516	−0.84985664
831	1.116827432	−0.75462162	0.39137278	−0.04171761
832	0.516805788	−0.98195801	−1.03806082	−0.25383454
833	1.490368312	0.080687244	−0.97130296	0.833722265
834	−0.369014518	−1.35841128	−1.27372214	1.351157886
835	0.914072736	−0.8695664	0.36889122	−0.08606658
836	0.998848923	−0.42464651	−0.23731009	0.395895785
837	1.670680003	0.070165381	−0.64700996	−0.85055617
838	0.810918992	−0.75696962	−0.21854084	0.836677293
839	1.066219316	−0.66764691	−0.49983634	0.669914
840	1.078821776	−0.72511699	−1.00012288	−0.15789319
845	−0.163950017	−0.21616766	0.65276069	−0.52575739
846	0.665621985	−3.16625248	0.34329102	−1.44312939
847	−0.233400992	−1.15488444	0.83051343	−1.85751897
848	−0.631135606	0.037691556	0.57903451	−0.9926
849	1.707541313	0.010345383	0.48581606	1.513341091
850	1.447075297	0.022864201	0.99130501	0.473154634
851	−0.24632881	−0.23975349	−0.01449288	0.574861147
852	1.176028423	−0.85747031	−0.72464089	0.30542841
856	2.237616041	0.345329597	−0.60597063	−0.71581056
858	−1.47960224	−2.5770536	−1.03619781	0.847300104
864	1.670680003	1.284791101	0.14864516	−0.84985664
865	1.670680003	1.916382859	0.6998144	1.124089601
866	1.024819853	−0.7521596	0.35073152	−2.14193241
868	2.237616041	−0.17986241	−0.86317199	1.325805381
869	1.747776963	−0.25802105	−1.11614995	−0.77093434
870	2.592229701	2.030913569	−0.50618719	1.463926567
871	2.592229701	2.510587108	−0.07540594	−0.58371481
872	1.800767509	1.372656013	2.09551175	2.849728342
873	1.849432484	4.556065495	−0.39732139	−0.67726477
875	0.201768224	0.618509503	−0.39732139	−0.67726477
876	2.237616041	1.553468488	−0.72864242	−0.33330779
877	0.323968221	−1.00428076	−1.65151616	1.031096548
878	0.783570663	2.023288951	−0.03975252	0.474038265
879	1.187592149	1.464239711	0.67009263	1.103774764
880	−0.192632911	0.142411101	0.79310676	0.125548041
881	1.071875228	0.911734331	−1.50008456	0.185176261
882	0.798806784	−0.1516478	−0.64900063	−0.77199025
883	−0.671908804	−0.65984824	0.5238174	−0.85314111
884	2.863652137	1.896850773	0.06443558	−0.44689505
885	2.314558863	−0.25458637	0.22080129	−0.04142716
886	2.314558863	−0.25458637	0.22080129	−0.04142716
888	0.131224024	0.21510779	−1.70996346	0.964902175
889	0.742030255	0.281479436	−1.4156326	−1.91369695
890	1.071875228	0.911734331	−1.50008456	0.185176261
891	0.742030255	0.281479436	−1.4156326	−1.91369695
892	1.749446006	0.076054765	−0.59137073	0.291488011
893	0.869958847	0.843158237	0.61532515	3.158279932
894	1.749446006	0.076054765	−0.59137073	0.291488011
897	−0.047486491	1.045012945	−0.25220201	−0.31982826
899	0.784181146	−0.20530019	−1.89414748	0.152726109
900	0.784181146	−0.20530019	−1.89414748	0.152726109
901	−0.440378333	0.918089245	0.03050609	−1.62235977
902	−0.2346025	0.890438419	−0.13206526	−0.83961838
903	−0.440378333	0.918089245	0.03050609	−1.62235977

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
904	−1.320466583	−2.49763118	0.9787365	−1.85867969
905	−0.386224123	−0.24799559	1.19406353	−1.61243489
908	1.878331515	1.287303121	0.11530502	1.132065786
909	0.614968453	−1.61827184	−0.80789799	−0.66927285
912	0.530707518	0.774109528	3.0396125	4.394775258
913	0.337020095	1.531840025	0.10544973	0.347450471
914	0.774589061	1.224705331	1.87994281	−0.11684579
916	−0.363201351	0.35600238	−1.20673542	2.056973054
918	0.153047955	0.702054562	0.76757802	0.096096862
919	2.891894151	2.295157633	3.54101626	1.984030826
920	1.292959895	0.808281618	2.92956952	2.204248324
921	−0.465333775	0.862817284	0.1439546	0.64701735
922	1.54265003	0.291977233	0.79089158	0.801314068
923	1.340862559	0.503169303	0.53213093	3.164832031
924	0.158497146	1.507280765	2.25315926	1.173977914
925	1.23162703	1.671882685	3.1838372	−0.22917041
926	2.608734063	3.080604939	−0.69726361	−0.36219702
927	1.879182741	3.409153142	2.48473663	3.409954437
928	−0.093106169	0.019939108	0.15932154	1.229749745
929	1.670680003	1.94609957	0.19633838	1.14825764
930	3.052627325	0.956834107	−0.29721209	−0.31007607
931	0.367631287	0.501274945	−1.31074554	−0.39331005
933	3.702965303	3.03402795	4.33630831	4.238503729
937	0.570011387	0.097928934	1.03350455	−0.13392581
939	1.801474588	0.770314085	0.70188154	0.22333959
940	−0.412950838	−0.1781887	0.50649275	−0.57215449
941	1.691004766	−0.42331992	0.66279648	0.0318465
942	1.451782586	−0.565439	−0.32447381	−0.43378383
943	1.188491672	0.120632811	0.20106994	3.078484746
945	1.214814941	0.806987609	0.47605587	1.372949466
946	0.561732094	1.21448402	0.35542793	−1.03704442
947	0.956565856	1.505997176	0.88115653	−0.60583691
948	0.592575441	1.383482681	0.93567635	1.058669028
950	0.343657562	−0.85471906	−0.21125904	1.184648122
951	1.236659334	3.828926809	1.57729777	−0.31942874
953	1.836389049	0.755753735	−0.36014522	1.262853393
953	1.836389049	0.755753735	−0.36014522	1.262853393
954	1.001653875	−0.85635082	0.89224781	−0.39245818
955	−0.122918652	−0.846489	−0.63367729	1.182912962
956	0.589766639	−0.9783487	−0.67638264	−0.38772225
958	0.715082397	−0.90020686	0.86817768	0.030652004
959	1.609198886	0.500797943	0.795571	0.908389449
960	0.952787327	−0.90555475	−0.17381408	0.06786323
962	1.836429446	0.208275147	−0.14300625	1.067462181
965	1.9158432	0.35211823	−1.02174589	0.625657932
967	1.383869627	0.274520494	−0.11659267	0.840327437
969	−0.445579934	−1.68867059	−0.5241276	2.233793943
971	0.736419048	0.409875189	−0.63140848	0.034514594
973	1.073465817	2.18418874	2.01361447	−0.93754437
974	0.130904221	1.882440008	1.85101055	0.112524893
976	−0.236681385	−0.09745533	0.1779313	2.08923366
977	0.904402612	0.936956925	0.87731788	0.102346515
978	2.201759817	2.123549573	3.7881607	2.358768953
980	1.784266982	1.845281076	3.42873622	−0.31098233
981	−0.225023329	0.087962898	−0.29053012	0.514272787
982	−0.231175318	−0.0159671	1.27391892	1.090487158
983	0.889215441	0.24321159	0.06877629	0.816247177
985	1.864634345	0.133647536	1.29803755	1.951226654
986	0.511450274	−2.33512445	−0.56246315	−0.42184152
987	0.847260813	0.368638185	0.4114346	0.219336109
988	1.596170102	1.592158381	0.30052357	0.283467897
993	−3.549941097	−2.6847861	−0.17502622	1.41034664
994	0.445802042	0.899738574	0.61059602	0.323194673
995	0.949498724	0.357111159	0.28371155	−0.14156488
998	2.197271885	1.578871826	0.90563334	1.056619658
998	2.197271885	1.578871826	0.90563334	1.056619658
1000	1.456120673	0.626173572	0.07683183	−0.43324035
1001	−0.440378333	0.918089245	0.03050609	−1.62235977
1002	0.819929066	0.459101825	−0.09227583	0.324342063
1003	1.64412453	−0.09343399	0.70197344	3.710273595
1004	0.796928207	0.459954079	−0.88538616	0.152000937
1005	0.044923203	−0.19994963	0.60082875	0.258347835
1006	−0.320452673	−0.33232662	−0.52315783	1.406273663
1007	4.040291133	3.474551355	3.57146797	3.565985043
1008	0.764519082	0.917635102	2.88258762	2.319622474

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
1009	−0.071112206	0.539362906	2.98048732	0.580423329
1010	−0.689737481	0.547928768	1.98805626	−0.76653376
1011	0.343668917	0.931501008	−0.05483722	0.395369857
1012	1.926713131	0.124849138	−0.09654906	1.126499382
1016	0.124247716	0.193102712	0.39003599	1.737670628
1017	0.131224136	0.21510779	−1.70996346	0.964902175
1018	0.499624069	0.962843507	0.77617619	−1.15296947
1019	0.813491983	0.322635656	0.02800396	0.599500927
1020	0.715468114	1.015469049	1.45994989	0.352548581
1021	−1.176339404	1.539767848	−0.14427147	1.389902738
1022	1.364966718	1.690570939	2.05914194	2.364375484
1023	2.154641091	0.800066339	0.85365652	0.965810338
1024	2.302280068	1.252164308	1.73414439	1.549538352
1025	1.878331515	1.287303121	0.11530502	1.132065786
1026	2.97722987	2.096441965	3.87172868	0.550274831
1027	2.474381478	1.950326182	3.81861867	1.366897355
1028	1.778414353	3.114931059	4.47690731	6.054314034
1029	3.672910795	2.760483725	3.26915034	3.042677588
1030	−0.604959715	−2.13584086	0.8687855	0.024144016
1031	2.012732245	2.293857161	0.54405555	1.261882121
1032	−1.086688867	0.953083194	2.92177054	0.876865185
1033	1.617520676	1.008017006	2.21183536	−0.1288484
1035	2.506372295	3.419954592	4.58206882	4.134341651
1036	−0.675805062	−0.15357004	0.94597719	3.966016669
1037	−0.275092569	−0.67687665	−0.52763797	1.489972106
1038	2.753559643	3.81185814	2.71344734	2.243351472
1039	0.65087433	0.026885305	−0.0153558	0.011870127
1040	0.141526548	−1.65455278	0.50170705	−1.90794
1041	0.458680435	−0.69730218	−0.48806249	0.586073092
1042	−0.513264812	−0.22001961	0.36339519	1.03208599
1043	−1.497887014	−1.76116109	−0.76634926	1.137002742
1045	2.863652137	1.96790869	0.43661485	−0.44756897
1046	0.981194248	1.73892162	2.21166953	2.738129365
1047	0.981194248	1.73892162	2.21166953	2.738129365
1051	0.70261974	−0.22197386	0.19710806	−2.37196477
1052	0.662126832	0.741436531	0.61672724	0.289359903
1053	0.87463644	−0.19717783	1.2664131	−0.4187507
1054	0.284558077	−1.46754925	−0.03124571	0.587227244
1055	0.885837831	−0.91907796	−0.45817355	−1.1936897
1057	0.790964847	1.387925398	−0.18370692	1.302393792
1058	−1.052897931	−0.85226912	0.90324527	−1.09684959
1059	−0.871565421	−0.17856476	1.51267137	−1.52734367
1060	3.311161199	3.074783921	2.10199297	1.822541682
1061	−0.655128061	0.497032417	0.92381279	−0.56348341
1062	−0.443129049	0.96200606	1.51641349	−0.22974864
1063	1.385675542	0.738759296	1.1677069	0.501211562
1064	1.670680003	−0.20756775	−0.73755051	−0.84924056
1065	1.43532227	1.656262941	−1.09448841	1.674272267
1066	1.670680003	1.284791101	0.14864516	−0.84985664
1067	2.237616041	0.345329863	−0.60597063	−0.71581056
1069	−0.24632881	−0.23975349	−0.01449288	0.574861147
1070	1.670680003	0.070165381	−0.64700996	−0.85055617
1071	−1.02687397	−0.36244273	0.13010074	0.535909448
1072	1.670680003	1.94609957	0.19633838	1.14825764
1073	2.237616041	1.438074134	0.31117554	−0.71786492
1074	−0.192632911	0.142411101	0.79310676	0.125548041
1075	0.909356011	0.368597887	1.03689838	1.001198751
1076	0.812238101	0.195908668	0.21564664	0.219336109
1077	0.325255266	1.131242708	−2.79377204	−0.62848261
1078	0.325255266	1.131242708	−2.79377204	−0.62848261
1079	0.85330799	−0.6855194	−0.90046979	−0.46415796
1081	−0.131519393	0.731836014	0.81604919	−1.29993979
1082	0.744770665	0.155243763	−1.8029919	1.023503542
1083	1.415726941	0.086297223	3.43559555	−0.12964168
1084	0.161304111	0.66712144	0.58401752	0.373809692
1085	−0.72863532	−0.2873027	2.21251376	3.003873022
1088	−1.1773616	−0.23258175	0.40529195	0.994988969
1089	2.769817302	1.661618789	3.97585272	1.059236597
1090	3.052627325	0.420821685	−0.57080756	1.751222205
1091	−3.379896722	−3.71174986	2.53586709	0.644702886
1093	0.72304265	1.667011476	2.53982093	2.7903213
1095	0.744219765	1.372184572	0.15852396	1.126053442
1097	4.407270402	2.670641491	5.02636153	5.361271976
1098	−1.85804837	−2.59071226	−0.46522239	0.655734646
1099	0.745797788	−0.20547378	4.27836342	4.646390386

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Material No.	MORV value for Equation a.)	MORV Value for Equation b.)	MORV Value for Equation c.)	MORV value for Equation d.)
1102	2.068748434	−0.24299896	0.07214682	−1.11758276
1104	1.018876287	0.025163067	−0.1106021	0.838914654
1105	2.387326861	3.865456674	2.2251199	0.728667998
1107	2.352582059	2.595496601	3.20492728	2.844590737
1110	0.302703712	0.599942142	−0.25637571	−0.03195517
1111	0.750930333	0.656784751	1.68326413	0.329846578
1112	−0.205527848	0.287622624	−0.00340777	0.59203719
1115	0.999825037	0.662221152	0.43571192	0.342558518
1116	0.873381263	1.544324176	0.13703728	−0.38172701
1117	−0.682983903	1.798204302	2.42110319	−0.39173951
1118	0.069769623	0.496895599	0.67857133	−0.14954441
1119	−0.671908804	−0.65984824	0.5238174	−0.85314111
1120	0.953790113	1.106552668	3.00006904	1.585038764
1121	−1.184630973	2.476138312	4.80971952	2.450646806
1122	−1.02687397	−0.36244273	0.13010074	0.535909448
1125	0.387315524	−0.36101406	1.14153708	−0.75303953
1126	1.021783831	−0.0070257	−0.14327539	3.954381426
1127	0.990592079	0.305612583	0.14155512	−0.29526854
1128	0.990592079	0.305612583	0.14155512	−0.29526854
1129	3.18966648	3.284362987	4.49398568	3.950809104
1131	1.650621055	1.545704806	2.37535081	1.259373143
1133	−1.519747805	−0.60804324	0.02746106	0.590708892
1134	0.815942067	−0.16126019	−0.54117238	0.613093526
1135	0.626973385	1.998305877	2.61706075	1.570404253
1136	2.812199484	1.353198146	2.05618426	1.869204406
1137	2.208307057	1.387136198	3.21521374	2.069795393
1138	1.670680003	1.316442078	0.14822999	−0.46985154
1139	1.408517438	0.890457374	1.24524408	0.685687797
1140	2.765860952	2.525539595	4.12464228	3.833744077
1141	−0.484394663	0.677713073	−0.22783646	−0.37267608
1142	2.54335679	4.298105601	3.36234238	2.684404542
1143	4.204367611	3.062126931	3.4234313	2.072899554
1144	2.479165229	3.226545885	4.65897152	4.952127235
1145	2.479158921	3.226545885	4.65897152	4.952127235
1146	0.774334025	1.075800774	1.06893156	1.011113116
1147	0.844648531	1.21935371	2.59138595	0.805938034
1148	2.906236436	1.550674121	3.56959167	2.832126896
1149	2.837627443	3.707154326	4.53384262	2.625871865

Compositions and Methods

A personal care composition comprising, based on total composition weight,

a) a sum total of from about 0.0001% to about 2%, preferably from about 0.0001% to about 0.75%, more preferably from about 0.001% to about 0.5%, most preferably from about 0.007% to about 0.25% of 1 or more malodor reduction materials, preferably 1 to about 75 malodor reduction materials, more preferably 1 to about 50 malodor reduction materials, more preferably 1 to about 35 malodor reduction materials, most preferably 1 to about 20 malodor reduction materials, each of said malodor reduction materials having a MORV of at least 0.5, preferably from 0.5 to 10, more preferably from 1 to 10, most preferably from 1 to 5, and preferably each of said malodor reduction materials having a Universal MORV, or said sum total of malodor reduction materials having a Blocker Index of less than 3, more preferable less than about 2.5 even more preferably less than about 2 and still more preferably less than about 1 and most preferably 0 and/or a Blocker Index average of 3 to about 0.001; and

b) from about 0% to about 12%, preferably from about 0% to about 8%, more preferably from about 0.1% to about 4%, of one or more perfume raw materials having a MORV of less than 0.5, preferably less than 0, more preferably less than −2, most preferably less than −5;

c) from about 0.1% to about 99%, preferably from about 1% to about 80%, more preferably from about 5% to

about 70%, most preferably from about 10% to about 50% of a solvent, preferably said solvent is selected from, water, glycerin, and mixtures thereof;

d) from about 0% to about 50%, preferably from about 0% to about 40%, more preferably from about 0.1% to about 30%, most preferably from about 0.1% to about 15% of a material selected from the group consisting of a structurant, a humectant, a surfactant, an antimicrobial, and mixtures thereof

is disclosed.

In one aspect of said personal care composition according to claim **1**, wherein said sum total of malodor reduction materials has a Blocker Index of less than 3, more preferable less than about 2.5 even more preferably less than about 2 and still more preferably less than about 1 and most preferably 0 and/or a Blocker Index average of 3 to about 0.001.

In one aspect of said personal care composition, each of said malodor reduction materials has a MORV of at least 0.5, preferably from 0.5 to 10, more preferably from 1 to 10, most preferably from 1 to 5, and preferably each of said malodor reduction materials having a Universal MORV.

In one aspect of said personal care composition, said sum total of malodor reduction materials has a Fragrance Fidelity Index average of 3 to about 0.001 Fragrance Fidelity Index, preferably each malodor reduction material in said sum total of malodor reduction materials has a Fragrance Fidelity Index of less than 3, preferably less than 2, more preferably less than 1 and most preferably each malodor reduction material in said sum total of malodor reduction materials has a Fragrance Fidelity Index of 0.

In one aspect of said personal care composition, said composition comprises a malodor reduction material selected from the group consisting of Table 1, 3 and 3 materials and mixtures thereof; preferably said material is selected from the group consisting of Table 1 materials: 1, 2, 3, 4, 7, 9, 10, 11, 13, 14, 16, 17, 18, 21, 22, 23, 25, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 42, 43, 47, 48, 49, 50, 52, 57, 61, 62, 63, 64, 65, 67, 68, 69, 70, 71, 74, 75, 76, 77, 78, 79, 80, 82, 83, 85, 91, 92, 93, 98, 100, 101, 102, 103, 104, 105, 106, 108, 109, 110, 112, 113, 114, 117, 119, 120, 122, 123, 126, 128, 130, 134, 135, 137, 140, 141, 142, 143, 145, 146, 148, 149, 152, 153, 155, 156, 158, 159, 161, 162, 167, 168, 170, 174, 175, 176, 177, 178, 179, 182, 183, 184, 185, 186, 187, 189, 190, 192, 193, 195, 196, 197, 199, 206, 208, 209, 210, 211, 212, 215, 218, 221, 227, 228, 229, 230, 231, 233, 234, 238, 242, 243, 244, 246, 247, 249, 252, 253, 254, 256, 259, 260, 261, 263, 267, 269, 271, 274, 276, 277, 278, 280, 281, 285, 286, 288, 289, 290, 292, 293, 294, 295, 296, 300, 301, 303, 307, 316, 317, 318, 321, 322, 323, 324, 325, 328, 329, 330, 331, 332, 333, 334, 335, 336, 338, 339, 342, 343, 344, 347, 349, 350, 352, 353, 356, 358, 359, 360, 361, 362, 363, 364, 368, 369, 370, 371, 372, 373, 374, 375, 377, 378, 381, 385, 386, 388, 390, 391, 394, 397, 398, 407, 413, 414, 415, 416, 417, 418, 421, 424, 425, 426, 428, 429, 432, 436, 441, 444, 445, 449, 450, 453, 457, 459, 461, 462, 463, 464, 465, 466, 467, 468, 470, 471, 473, 474, 475, 478, 479, 480, 482, 484, 485, 486, 487, 488, 491, 493, 497, 498, 501, 502, 503, 505, 519, 520, 521, 524, 527, 529, 530, 531, 532, 534, 537, 541, 544, 546, 548, 550, 551, 552, 553, 555, 558, 559, 560, 561, 562, 563, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 577, 578, 580, 581, 582, 584, 586, 587, 589, 591, 592, 594, 595, 599, 600, 601, 603, 604, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 618, 620, 621, 624, 625, 626, 627, 628, 631, 632, 633, 635, 636, 638, 639, 644, 649, 650, 653, 655, 658, 659, 660, 661, 663, 668, 671, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 686, 691, 692, 693, 694, 696, 697, 698, 700, 702, 704, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 730, 731, 733, 735, 736, 738, 741, 742, 746, 748, 750, 752, 754, 757, 758, 763, 764, 766, 767, 768, 769, 770, 771, 772, 774, 775, 776, 778, 781, 782, 786, 788, 791, 792, 800, 802, 803, 804, 805, 806, 807, 814, 821, 824, 826, 827, 828, 829, 831, 833, 834, 837, 839, 840, 849, 850, 852, 856, 864, 865, 866, 868, 869, 870, 871, 872, 873, 876, 877, 878, 879, 881, 884, 885, 886, 890, 892, 893, 894, 897, 905, 908, 912, 913, 914, 916, 919, 920, 922, 923, 924, 925, 926, 927, 928, 929, 930, 933, 937, 939, 941, 942, 943, 945, 946, 947, 948, 950, 951, 953, 954, 955, 959, 962, 965, 967, 969, 973, 974, 976, 978, 980, 982, 985, 988, 993, 998, 1000, 1003, 1006, 1007, 1008, 1009, 1010, 1012, 1016, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1031, 1032, 1033, 1035, 1036, 1037, 1038, 1042, 1043, 1045, 1046, 1047, 1053, 1057, 1059, 1060, 1062, 1063, 1064, 1065, 1066, 1067, 1070, 1072, 1073, 1075, 1077, 1078, 1082, 1083, 1085, 1089, 1090, 1091, 1093, 1095, 1097, 1099, 1102, 1104, 1105, 1107, 1111, 1113, 1116, 1117, 1120, 1121, 1125, 1126, 1129, 1131, 1135, 1136, 1137, 1138, 1139, 1140, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, Table 2 materials: 2, 23, 141, 185, 227, 230, 246, 248, 343, 359, 565, 631, 659, 674, 678, 679, 715, 758, 1028, 1097, Table 3 materials: 12, 19, 20, 24, 26, 27, 53, 54, 55, 59, 72, 73, 81, 84, 96, 97, 107, 111, 115, 116, 125, 133, 147, 150, 151, 154, 157, 163, 166, 169, 181, 191, 194, 198, 201, 204, 205, 213, 214, 232, 237, 239, 255, 258, 264, 270, 273, 275, 282, 283, 284, 287, 302, 306, 308, 310, 312, 314, 319, 346, 354, 355, 365, 366, 376, 379, 387, 400, 412, 419, 420, 437, 438, 439, 440, 442, 443, 447, 448, 454, 455, 469, 472, 477, 481, 492, 495, 496, 504, 509, 510, 512, 515, 517, 518, 522, 525, 526, 528, 535, 536, 538, 540, 542, 547, 549, 554, 556, 557, 575, 576, 579, 583, 585, 588, 602, 605, 617, 619, 640, 641, 645, 647, 651, 652, 662, 664, 665, 667, 672, 687, 699, 701, 703, 740, 743, 744, 745, 755, 760, 761, 777, 779, 784, 789, 796, 797, 799, 808, 810, 811, 812, 817, 819, 820, 832, 835, 836, 838, 845, 846, 847, 848, 851, 858, 875, 880, 882, 883, 888, 889, 891, 899, 900, 901, 902, 903, 904, 909, 918, 921, 931, 940, 956, 958, 960, 971, 977, 981, 983, 986, 987, 994, 995, 1001, 1002, 1004, 1005, 1011, 1017, 1018, 1019, 1030, 1039, 1040, 1041, 1051, 1052, 1054, 1055, 1058, 1061, 1069, 1071, 1074, 1076, 1079, 1081, 1084, 1088, 1098, 1110, 1112, 1115, 1118, 1119, 1122, 1127, 1128, 1133, 1134, 1141 and mixtures thereof; more preferably said malodor reduction materials are selected from the group consisting of Table 1 materials: 1, 2, 3, 4, 7, 9, 10, 11, 13, 14, 16, 17, 18, 21, 22, 23, 25, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 42, 43, 47, 48, 49, 50, 52, 57, 61, 62, 63, 64, 65, 67, 68, 69, 70, 71, 74, 75, 76, 77, 78, 79, 80, 82, 83, 85, 91, 92, 93, 98, 100, 101, 102, 103, 104, 105, 106, 108, 109, 110, 112, 113, 114, 117, 119, 120, 122, 123, 126, 128, 130, 134, 135, 137, 140, 141, 142, 143, 145, 146, 148, 149, 152, 153, 155, 156, 158, 159, 161, 162, 167, 168, 170, 174, 175, 176, 177, 178, 179, 182, 183, 184, 185, 186, 187, 189, 190, 192, 193, 195, 196, 197, 199, 206, 208, 209, 210, 211, 212, 215, 218, 221, 227, 228, 229, 230, 231, 233, 234, 238, 242, 243, 244, 246, 247, 249, 252, 253, 254, 256, 259, 260, 261, 263, 267, 269, 271, 274, 276, 277, 278, 280, 281, 285, 286, 288, 289, 290, 292, 293, 294, 295, 296, 300, 301, 303, 307, 316, 317, 318, 321, 322, 323, 324, 325, 328, 329, 330, 331, 332, 333, 334, 335, 336, 338, 339, 342, 343, 344, 347, 349, 350, 352, 353, 356, 358, 359, 360, 361, 362, 363, 364, 368, 369, 370, 371, 372, 373, 374, 375, 377, 378, 381, 385, 386, 388, 390, 391, 394, 397, 398, 407, 413, 414, 415, 416, 417, 418, 421, 424, 425, 426, 428, 429, 432, 436, 441, 444, 445, 449, 450, 453, 457, 459, 461, 462, 463, 464, 465, 466, 467, 468, 470, 471, 473, 474, 475, 478,

479, 480, 482, 484, 485, 486, 487, 488, 491, 493, 497, 498, 501, 502, 503, 505, 519, 520, 521, 524, 527, 529, 530, 531, 532, 534, 537, 541, 544, 546, 548, 550, 551, 552, 553, 555, 558, 559, 560, 561, 562, 563, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 577, 578, 580, 581, 582, 584, 586, 587, 589, 591, 592, 594, 595, 599, 600, 601, 603, 604, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 618, 620, 621, 624, 625, 626, 627, 628, 631, 632, 633, 635, 636, 638, 639, 644, 649, 650, 653, 655, 658, 659, 660, 661, 663, 668, 671, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 686, 691, 692, 693, 694, 696, 697, 698, 700, 702, 704, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 730, 731, 733, 735, 736, 738, 741, 742, 746, 748, 750, 752, 754, 757, 758, 763, 764, 766, 767, 768, 769, 770, 771, 772, 774, 775, 776, 778, 781, 782, 786, 788, 791, 792, 800, 802, 803, 804, 805, 806, 807, 814, 821, 824, 826, 827, 828, 829, 831, 833, 834, 837, 839, 840, 849, 850, 852, 856, 864, 865, 866, 868, 869, 870, 871, 872, 873, 876, 877, 878, 879, 881, 884, 885, 886, 890, 892, 893, 894, 897, 905, 908, 912, 913, 914, 916, 919, 920, 922, 923, 924, 925, 926, 927, 928, 929, 930, 933, 937, 939, 941, 942, 943, 945, 946, 947, 948, 950, 951, 953, 954, 955, 959, 962, 965, 967, 969, 973, 974, 976, 978, 980, 982, 985, 988, 993, 998, 1000, 1003, 1006, 1007, 1008, 1009, 1010, 1012, 1016, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1031, 1032, 1033, 1035, 1036, 1037, 1038, 1042, 1043, 1045, 1046, 1047, 1053, 1057, 1059, 1060, 1062, 1063, 1064, 1065, 1066, 1067, 1070, 1072, 1073, 1075, 1077, 1078, 1082, 1083, 1085, 1089, 1090, 1091, 1093, 1095, 1097, 1099, 1102, 1104, 1105, 1107, 1111, 1113, 1116, 1117, 1120, 1121, 1125, 1126, 1129, 1131, 1135, 1136, 1137, 1138, 1139, 1140, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, Table 2 materials: 2, 23, 141, 185, 227, 230, 246, 248, 343, 359, 565, 631, 659, 674, 678, 679, 715, 758, 1028, 1097 and mixtures thereof; more preferably said malodor reduction materials are selected from the group consisting of Table 4 materials 7, 14, 39, 48, 183, 199, 206, 212, 215, 229, 260, 261, 281, 329, 335, 353, 360, 441, 484, 487, 488, 501, 566, 567, 569, 570, 573, 574, 603, 616, 621, 624, 627, 632, 663, 680, 684, 694, 696, 708, 712, 714, 726, 750, 764, 775, 776, 788, 804, 872, 919, 927, 933, 978, 1007, 1022, 1024, 1027, 1029, 1035, 1038, 1060, 1089, 1107, 1129, 1131, 1136, 1137, 1140, 1142, 1143, 1144, 1145, 1148, 1149, Table 5 material 248 and mixtures thereof, most preferably said malodor reduction materials are selected from the group consisting of Table 4 materials 261, 680, 788, 1129, 1148, 1149 and mixtures thereof.

In one aspect of said personal care composition, said composition comprises one or more perfume raw materials.

In one aspect of said personal care composition, said sum total of malodor reduction materials has an average Log P, based on weight percent of each malodor reduction material in said sum total of malodor reduction materials, of from about 2.5 to about 8, preferably from about 3 to about 8, more preferably from about 3.5 to about 7, most preferably, each of said malodor reduction materials in said sum total of malodor reduction materials and each of said one or more perfume raw materials has a Log P from about 3.5 to about 7. This range of Log P will allow the malodor reduction material's to deposit on the skin and not wash away in the water phase during use

In one aspect of said personal care composition, the ratio of said one or more perfume raw materials to said sum total of malodor reduction material being from about 1000:1 to about 1:1, preferably from about 100:1 to about 1:1, more preferably from about 10:1 to about 1:1, most preferably from about 2:1 to about 1:1.

In one aspect of said personal care composition, less than 10%, preferably less than 5%, more preferably less than 1% of said malodor reduction materials and said one or more perfume raw materials, based on total combined weight of malodor reduction materials and said one or more perfume raw materials comprise an ionone moiety.

In one aspect of said cleaning and/or treatment product, said malodor reduction materials are not selected from the group consisting of Tables 1-3 materials 302; 288; 50; 157; 1017; 888; 64; 1054; 832; 375; 390; 745; 504; 505; 140; 1012; 498; 362; 103; 356; 1074; 908; 1127; 475; 918; 687; 611; 317; 9; 141; 550; 602; 913; 1005; 521; 10; 215; 370; 335; 378; 1121; 360; 565; 1136; 1129; 655; 369; 1065; 914; 757; 601; 478; 889; 891; 358; 973; 162; 554; 522; 312; 125; 26; 418; 92; 586; 1026; 218; 31; 828; 871; 829; 1066; 287; 269; 769; 701; 1118; 70; 946; 142; 109; 108 and mixtures thereof.

In one aspect of said personal care composition, said composition comprises a total of, based on total consumer product weight, from about 0.1% to about 7% of one or more of said malodor reduction materials and from about 3% to 30% of a surfactant, and, optionally, a miscellar phase and/or lamellar phase.

In one aspect of said personal care composition, said composition comprises a total, based on total consumer product weight, of from about 0.1% to about 50% of a material selected from structurants, humectants, fatty acids, inorganic salts, antimicrobial agents, antimicrobial agents actives and mixtures thereof.

In one aspect of said personal care composition, said composition comprises an adjunct ingredient selected from the group consisting of clay mineral powders, pearl pigments, organic powders, emulsifiers, distributing agents, pharmaceutical active, topical active, preservatives, surfactants and mixtures thereof.

A method of controlling malodors comprising: contacting a situs comprising a malodor and/or a situs that will become malodorous with a personal care composition selected from the group consisting of the personal care compositions disclosed herein is disclosed.

In one aspect of said method, said situs comprises the body or head of hair and said contacting step comprises contacting said body or hair containing a malodor with a sufficient amount of Applicants' personal care composition to provide said body or hair with a level of malodor reduction material at least 0.0001 mg of malodor reduction material per body or head of hair, preferably from about 0.0001 mg of malodor reduction material per body or head of hair to about 1 mg of malodor reduction material per body or head of hair, more preferably from about 0.001 mg of malodor reduction material per body or head of hair about 0.5 mg of malodor reduction material per body or head of hair, most preferably from about 0.01 of malodor reduction material per body or head of hair to about 0.2 mg of malodor reduction material per body or head of hair.

Adjunct Materials

While not essential for the purposes of the present invention, the non-limiting list of adjuncts illustrated hereinafter are suitable for use in the instant compositions and may be desirably incorporated in certain aspects of the invention, for example to assist or enhance performance, A variety of optional ingredients can also be added to personal care compositions.

Optional ingredients can include, but are not limited to, structurants, humectants, fatty acids, inorganic salts, and other antimicrobial agents or actives.

A personal care composition can also include hydrophilic structurants such as carbohydrate structurants and gums. Some suitable carbohydrate structurants include raw starch (corn, rice, potato, wheat, and the like) and pregelatinized starch. Some suitable gums include carregeenan and xanthan gum. A personal care composition can include from about 0.1% to about 30%, from about 2% to about 25%, or from about 4% to about 20%, by weight of the personal care composition, of a carbohydrate structurant.

A personal care composition can also include one or more humectants. Examples of such humectants can include polyhydric alcohols. Further, humectants such as glycerin can be included the personal care composition as a result of production or as an additional ingredient. For example, glycerin can be a by-product after saponification of the personal care composition. Including additional humectant can result in a number of benefits such as improvement in hardness of the personal care composition, decreased water activity of the personal care composition, and reduction of a weight loss rate of the personal care composition over time due to water evaporation.

A personal care composition can include inorganic salts. Inorganic salts can help to maintain a particular water content or level of the personal care composition and improve hardness of the personal care composition. The inorganic salts can also help to bind the water in the personal care composition to prevent water loss by evaporation or other means. A personal care composition can optionally include from about 0.01% to about 15%, from about 1% to about 12%, or from about 2.5% to about 10.5%, by weight of the personal care composition, of inorganic salt. Examples of suitable inorganic salts can include magnesium nitrate, trimagnesium phosphate, calcium chloride, sodium carbonate, sodium aluminum sulfate, disodium phosphate, sodium polymetaphosphate, sodium magnesium succinate, sodium tripolyphosphate, aluminum sulfate, aluminum chloride, aluminum chlorohydrate, aluminum-zirconium trichlorohydrate, aluminum-zirconium trichlorohydrate glycine complex, zinc sulfate, ammonium chloride, ammonium phosphate, calcium acetate, calcium nitrate, calcium phosphate, calcium sulfate, ferric sulfate, magnesium chloride, magnesium sulfate, and tetrasodium pyrophosphate.

A personal care composition can include one or more additional antibacterial agents that can serve to further enhance antimicrobial effectiveness of the personal care composition. A personal care composition can include, for example, from about 0.001% to about 2%, from about 0.01% to about 1.5%, or from about 0.1% to about 1%, by weight of the personal care composition, of additional antibacterial agent(s). Examples of suitable antibacterial agents can include carbanilides, triclocarban (also known as trichlorocarbanilide), triclosan, a halogenated diphenylether available as DP-300 TM from Ciba-Geigy, hexachlorophene, 3,4,5-tribromosalicylanilide, and salts of 2-pyridinethiol-1-oxide, salicylic acid, and other organic acids. Other suitable antibacterial agents are described in U.S. Pat. No. 6,488,943.

Scalp Active Material

In an embodiment of the present invention, the personal care composition may comprise a scalp active material, which may be an anti-dandruff active. In an embodiment, the anti-dandruff active is selected from the group consisting of: pyridinethione salts; zinc carbonate; azoles, such as ketoconazole, econazole, and elubiol; selenium sulfide; particulate sulfur; keratolytic agents such as salicylic acid; and mixtures thereof. In a further embodiment, the anti-dandruff active may be an anti-dandruff particulate. In an embodiment, the anti-dandruff particulate is a pyridinethione salt. Such anti-dandruff particulate should be physically and chemically compatible with the components of the composition, and should not otherwise unduly impair product stability, aesthetics or performance.

Pyridinethione particulates are suitable particulate anti-dandruff actives for use in composition of the present invention. In an embodiment, the anti-dandruff active is a 1-hydroxy-2-pyridinethione salt and is in particulate form. In an embodiment, the concentration of pyridinethione anti-dandruff particulate ranges from about 0.01% to about 5%, by weight of the composition, or from about 0.1% to about 3%, or from about 0.1% to about 2%. In an embodiment, the pyridinethione salts are those formed from heavy metals such as zinc, tin, cadmium, magnesium, aluminium and zirconium, generally zinc, typically the zinc salt of 1-hydroxy-2-pyridinethione (known as "zinc pyridinethione" or "ZPT"; zinc pyrithione), commonly 1-hydroxy-2-pyridinethione salts in platelet particle form. In an embodiment, the 1-hydroxy-2-pyridinethione salts in platelet particle form have an average particle size of up to about 20 microns, or up to about 5 microns, or up to about 2.5 microns. Salts formed from other cations, such as sodium, may also be suitable. Pyridinethione anti-dandruff actives are described, for example, in U.S. Pat. No. 2,809,971; U.S. Pat. No. 3,236,733; U.S. Pat. No. 3,753,196; U.S. Pat. No. 3,761,418; U.S. Pat. No. 4,345,080; U.S. Pat. No. 4,323,683; U.S. Pat. No. 4,379,753; and U.S. Pat. No. 4,470,982.

In an embodiment, in addition to the anti-dandruff active selected from polyvalent metal salts of pyrithione, the composition further comprises one or more anti-fungal and/or anti-microbial actives. In an embodiment, the anti-microbial active is selected from the group consisting of: coal tar, sulfur, fcharcoal, whitfield's ointment, castellani's paint, aluminum chloride, gentian violet, octopirox (piroctone olamine), ciclopirox olamine, undecylenic acid and its metal salts, potassium permanganate, selenium sulfide, sodium thiosulfate, propylene glycol, oil of bitter orange, urea preparations, griseofulvin, 8-hydroxyquinoline ciloquinol, thiobendazole, thiocarbamates, haloprogin, polyenes, hydroxypyridone, morpholine, benzylamine, allylamines (such as terbinafine), tea tree oil, clove leaf oil, coriander, palmarosa, berberine, thyme red, cinnamon oil, cinnamic aldehyde, citronellic acid, hinokitol, ichthyol pale, azelaic acid, lyticase, iodopropynyl butylcarbarnate (IPBC), isothiazalinones such as octyl isothiazalinone, and azoles, and mixtures thereof. In an embodiment, the anti-microbial is selected from the group consisting of: itraconazole, ketoconazole, selenium sulfide, coal tar, and mixtures thereof.

In an embodiment, the azole anti-microbials is an imidazole selected from the group consisting of: benzimidazole, benzothiazole, bifonazole, butaconazole nitrate, climbazole, clotrimazole, croconazole, eberconazole, econazole, elubiol, fenticonazole, fluconazole, flutimazole, isoconazole, ketoconazole, lanoconazole, metronidazole, miconazole, neticonazole, omoconazole, oxiconazole nitrate, sertaconazole, sulconazole nitrate, tioconazole, thiazole, and mixtures thereof, or the azole anti-microbials is a triazole selected from the group consisting of: terconazole, itraconazole, and mixtures thereof. When present in the composition, the azole anti-microbial active is included in an amount of from about 0.01% to about 5%, or from about 0.1% to about 3%, or from about 0.3% to about 2%, by total weight of the composition. In an embodiment, the azole anti-microbial active is ketoconazole. In an embodiment, the sole anti-microbial active is ketoconazole.

The present invention may also comprise a combination of anti-microbial actives. In an embodiment, the combination of anti-microbial active is selected from the group of combinations consisting of: octopirox and zinc pyrithione, pine tar and sulfur, salicylic acid and zinc pyrithione, salicylic acid and elubiol, zinc pyrithione and elubiol, zinc pyrithione and climbasole, octopirox and climbasole, salicylic acid and octopirox, and mixtures thereof.

In an embodiment, the composition comprises an effective amount of a zinc-containing layered material. In an embodiment, the composition comprises from about 0.001% to about 10%, or from about 0.01% to about 7%, or from about 0.1% to about 5% of a zinc-containing layered material, by total weight of the composition.

(A.F. Wells "Structural Inorganic Chemistry" Clarendon Press, 1975).

Many ZLMs occur naturally as minerals. In an embodiment, the ZLM is selected from the group consisting of: hydrozincite (zinc carbonate hydroxide), basic zinc carbonate, aurichalcite (zinc copper carbonate hydroxide), rosasite (copper zinc carbonate hydroxide), and mixtures thereof. Related minerals that are zinc-containing may also be included in the composition. Natural ZLMs can also occur wherein anionic layer species such as clay-type minerals (e.g., phyllosilicates) contain ion-exchanged zinc gallery ions. All of these natural materials can also be obtained synthetically or formed in situ in a composition or during a production process.

(Crepaldi, EL, Sava, PC, Tronto, J, Valim, JB *J. Colloid Interfac. Sci.* 2002, 248, 429-42).

(Morioka, H., Tagaya, H., Karasu, M, Kadokawa, J, Chiba, K *Inorg. Chem.* 1999, 38, 4211-6).

In an embodiment, the composition comprises basic zinc carbonate. Commercially available sources of basic zinc carbonate include Zinc Carbonate Basic (Cater Chemicals: Bensenville, Ill., USA), Zinc Carbonate (Shepherd Chemicals: Norwood, Ohio, USA), Zinc Carbonate (CPS Union Corp.: New York, N.Y., USA), Zinc Carbonate (Elementis Pigments: Durham, UK), and Zinc Carbonate AC (Bruggemann Chemical: Newtown Square, Pa., USA). Basic zinc carbonate, which also may be referred to commercially as "Zinc Carbonate" or "Zinc Carbonate Basic" or "Zinc Hydroxy Carbonate", is a synthetic version consisting of materials similar to naturally occurring hydrozincite. The idealized stoichiometry is represented by $Zn_5(OH)_6(CO_3)_2$ but the actual stoichiometric ratios can vary slightly and other impurities may be incorporated in the crystal lattice.

In embodiments having a zinc-containing layered material and a pyrithione or polyvalent metal salt of pyrithione, the ratio of zinc-containing layered material to pyrithione or a polyvalent metal salt of pyrithione is from about 5:100 to about 10:1, or from about 2:10 to about 5:1, or from about 1:2 to about 3:1.

Liquid Personal Care Compositions

Exemplary liquid rinse-off personal care compositions can include an aqueous carrier, which can be present at a level of from about 5% to about 95%, or from about 60% to about 85%. The aqueous carrier may comprise water, or a miscible mixture of water and organic solvent. Non-aqueous carrier materials can also be employed.

Such rinse-off personal care compositions can include one or more detersive surfactants. The detersive surfactant component can be included to provide cleaning performance to the product. The detersive surfactant component in turn comprises anionic detersive surfactant, zwitterionic or amphoteric detersive surfactant, or a combination thereof. A representative, non-limiting, list of anionic surfactants includes anionic detersive surfactants for use in the compositions can include ammonium lauryl sulfate, ammonium laureth sulfate, triethylamine lauryl sulfate, triethylamine laureth sulfate, triethanolamine lauryl sulfate, triethanolamine laureth sulfate, monoethanolamine lauryl sulfate, monoethanolamine laureth sulfate, diethanolamine lauryl sulfate, diethanolamine laureth sulfate, lauric monoglyceride sodium sulfate, sodium lauryl sulfate, sodium laureth sulfate, potassium lauryl sulfate, potassium laureth sulfate, sodium lauryl sarcosinate, sodium lauroyl sarcosinate, lauryl sarcosine, cocoyl sarcosine, ammonium cocoyl sulfate, ammonium lauroyl sulfate, sodium cocoyl sulfate, sodium lauroyl sulfate, potassium cocoyl sulfate, potassium lauryl sulfate, triethanolamine lauryl sulfate, triethanolamine lauryl sulfate, monoethanolamine cocoyl sulfate, monoethanolamine lauryl sulfate, sodium tridecyl benzene sulfonate, sodium dodecyl benzene sulfonate, sodium cocoyl isethionate and combinations thereof. In one example, the anionic surfactant can be sodium lauryl sulfate or sodium laureth sulfate. The concentration of the anionic surfactant component in the product can be sufficient to provide a desired cleaning and/or lather performance, and generally ranges from about 2% to about 50%.

Amphoteric detersive surfactants suitable for use in the rinse-off personal care compositions are well known in the art, and include those surfactants broadly described as derivatives of aliphatic secondary and tertiary amines in which an aliphatic radical can be straight or branched chain and wherein an aliphatic substituent can contain from about 8 to about 18 carbon atoms such that one carbon atom can contain an anionic water solubilizing group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Examples of compounds falling within this definition can be sodium 3-dodecyl-aminopropionate, sodium 3-dodecylaminopropane sulfonate, sodium lauryl sarcosinate, N-alkyltaurines such as the one prepared by reacting dodecylamine with sodium isethionate according to the teaching of U.S. Pat. No. 2,658,072, N-higher alkyl aspartic acids such as those produced according to the teaching of U.S. Pat. No. 2,438,091, and products described in U.S. Pat. No. 2,528,378. Other examples of amphoteric surfactants can include sodium lauroamphoacetate, sodium cocoamphoactetate, disodium lauroamphoacetate disodium cocodiamphoacetate, and mixtures thereof. Amphoacetates and diamphoacetates can also be used.

Zwitterionic detersive surfactants suitable for use in the rinse-off personal care compositions are well known in the art, and include those surfactants broadly described as derivatives of aliphatic quaternary ammonium, phosphonium, and sulfonium compounds, in which aliphatic radicals can be straight or branched chains, and wherein an aliphatic substituent can contain from about 8 to about 18 carbon atoms such that one carbon atom can contain an anionic group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Other zwitterionic surfactants can include betaines, including cocoamidopropyl betaine.

The liquid rinse off personal care composition can comprise one or more phases. Such personal care compositions can include a cleansing phase and/or a benefit phase (i.e., a single- or multi-phase composition). Each of a cleansing phase or a benefit phase can include various components. The cleansing phase and the benefit phase can be blended, separate, or a combination thereof. The cleansing phase and the benefit phase can also be patterned (e.g. striped).

The cleansing phase of a personal care composition can include at least one surfactant. The cleansing phase can be an aqueous structured surfactant phase and constitute from

about 5% to about 20%, by weight of the personal care composition. Such a structured surfactant phase can include sodium trideceth(n) sulfate, hereinafter STnS, wherein n can define average moles of ethoxylation. n can range, for example, from about 0 to about 3; from about 0.5 to about 2.7, from about 1.1 to about 2.5, from about 1.8 to about 2.2, or n can be about 2. When n can be less than 3, STnS can provide improved stability, improved compatibility of benefit agents within the personal care compositions, and increased mildness of the personal care compositions as disclosed in U.S. Pre-Grant Publication No. 2010/009285 A1.

The cleansing phase can also comprise at least one of an amphoteric surfactant and a zwitterionic surfactant. Suitable amphoteric or zwitterionic surfactants (in addition to those cited herein) can include, for example, those described in U.S. Pat. No. 5,104,646 and U.S. Pat. No. 5,106,609.

A cleansing phase can comprise a structuring system. A structuring system can comprise, optionally, a non-ionic emulsifier, optionally, from about 0.05% to about 5%, by weight of the personal care composition, of an associative polymer; and an electrolyte.

The personal care composition can optionally be free of sodium lauryl sulfate, hereinafter SLS, and can comprise at least a 70% lamellar structure. However, the cleansing phase could comprise at least one surfactant, wherein the at least one surfactant includes SLS. Suitable examples of SLS are described in U.S. Pre-Grant Publication No. 2010/0322878 A1.

Rinse-off personal care compositions can also include a benefit phase. The benefit phase can be hydrophobic and/or anhydrous. The benefit phase can also be substantially free of surfactant. A benefit phase can also include a benefit agent. In particular, a benefit phase can comprise from about 0.1% to about 50% benefit agent by weight of the personal care composition. The benefit phase can alternatively comprise less benefit agent, for example, from about 0.5% to about 20% benefit agent, by weight of the personal care composition. Examples of suitable benefit agents can include petrolatum, glyceryl monooleate, mineral oil, natural oils, and mixtures thereof. Additional examples of benefit agents can include water insoluble or hydrophobic benefit agents. Other suitable benefit agents are described in U.S. Pre-Grant Publication No. 2012/0009285 A1.

Non-limiting examples of glycerides suitable for use as hydrophobic skin benefit agents herein can include castor oil, safflower oil, corn oil, walnut oil, peanut oil, olive oil, cod liver oil, almond oil, avocado oil, palm oil, sesame oil, vegetable oils, sunflower seed oil, soybean oil, vegetable oil derivatives, coconut oil and derivatized coconut oil, cottonseed oil and derivatized cottonseed oil, jojoba oil, cocoa butter, and combinations thereof.

Non-limiting examples of alkyl esters suitable for use as hydrophobic skin benefit agents herein can include isopropyl esters of fatty acids and long chain esters of long chain (i.e. C10-C24) fatty acids, e.g., cetyl ricinoleate, non-limiting examples of which can include isopropyl palmitate, isopropyl myristate, cetyl riconoleate, and stearyl riconoleate. Other example can include hexyl laurate, isohexyl laurate, myristyl myristate, isohexyl palmitate, decyl oleate, isodecyl oleate, hexadecyl stearate, decyl stearate, isopropyl isostearate, diisopropyl adipate, diisohexyl adipate, dihexyldecyl adipate, diisopropyl sebacate, acyl isononanoate lauryl lactate, myristyl lactate, cetyl lactate, and combinations thereof.

Non-limiting examples of polyglycerin fatty acid esters suitable for use as hydrophobic skin benefit agents herein can include decaglyceryl distearate, decaglyceryl diisostearate, decaglyceryl monomyriate, decaglyceryl monolaurate, hexaglyceryl monooleate, and combinations thereof.

The rinse-off personal care composition can be applied by a variety of means, including by rubbing, wiping or dabbing with hands or fingers, or by means of an implement and/or delivery enhancement device. Non-limiting examples of implements include a sponge or sponge-tipped applicator, a mesh shower puff, a swab, a brush, a wipe (e.g., wash cloth), a loofah, and combinations thereof. Non-limiting examples of delivery enhancement devices include mechanical, electrical, ultrasonic and/or other energy devices. Employment of an implement or device can help delivery of the particulate antimicrobial agent to target regions, such as, for example, hair follicles and undulations that can exist in the underarm. The rinse-off care product can be sold together with such an implement or device. Alternatively, an implement or device can be sold separately but contain indicium to indicate usage with a rinse-off care product. Implements and delivery devices can employ replaceable portions (e.g., the skin interaction portions), which can be sold separately or sold together with the rinse-off care product in a kit.

Solid Personal Care Compositions

As noted herein, personal care compositions can take on numerous forms. One suitable form is that of a solid personal care composition. Solid compositions can take many forms like powder, pellets, bars, etc. These forms will generally be described herein as bar soap, but it should be understood that the solid composition could be in another form or shape. One example of a bar soap personal care composition can include from about 0.1% to about 35%, by weight of the personal care composition, of water, from about 45% to about 99%, by weight of the personal care composition, of soap, and from about 0.01% to about 5%, by weight of the personal care composition, of a particulate antimicrobial agent. Another suitable antimicrobial bar soap can include, for example, from about 0.1% to about 30%, by weight of the personal care composition, of water, from about 40% to about 99%, by weight of the personal care composition, of soap, and from about 0.25% to about 3%, by weight of the personal care composition, of a particulate antimicrobial agent.

Bar soap compositions can be referred to as conventional solid (i.e. non-flowing) bar soap compositions. Some bar soap composition can comprise convention soap, while others can contain synthetic surfactants, and still others can contain a mix of soap and synthetic surfactant. Bar compositions can include, for example, from about 0% to about 45% of a synthetic anionic surfactant. An example of a suitable conventional soap can include milled toilet bars that are unbuilt (i.e. include about 5% or less of a water-soluble surfactancy builder).

A personal care bar composition can include soap. By weight, the soap can be, for example, from about 45% to about 99%, or from about 50% to about 75%, by weight of the personal care composition. Such soaps can include a typical soap, i.e., an alkali metal or alkanol ammonium salt of an alkane- or alkene monocarboxylic acid. Sodium, magnesium, potassium, calcium, mono-, di- and tri-ethanol ammonium cations, or combinations thereof, can be suitable for a personal care composition. The soap included in a personal care composition can include sodium soaps or a combination of sodium soaps with from about 1% to about 25% ammonium, potassium, magnesium, calcium, or a mixture of these soaps. Additionally, the soap can be well-known alkali metal salts of alkanoic or alkenoic acids having from about 12 to about 22 carbon atoms or from about 12 to about 18 carbon atoms. Another suitable soap can be alkali

metal carboxylates of alkyl or alkene hydrocarbons having from about 12 to about 22 carbon atoms. Additional suitable soap compositions are described in U.S. Pre-Grant Publication No. 2012/0219610 A1.

A personal care composition can also include soaps having a fatty acid. For example, one bar soap composition could contain from about 40% to about 95% of a soluble alkali metal soap of C_8-C_{24} or C_{10}-C_{20} fatty acids. The fatty acid can, for example, have a distribution of coconut oil that can provide a lower end of a broad molecular weight range or can have a fatty acid distribution of peanut or rapeseed oil, or their hydrogenated derivatives, which can provide an upper end of the broad molecular weight range. Other such compositions can include a fatty acid distribution of tallow and/or vegetable oil. The tallow can include fatty acid mixtures that can typically have an approximate carbon chain length distribution of 2.5% C_{14}, 29% C_{16}, 23% C_{18}, 2% palmitoleic, 41.5% oleic, and 3% linoleic. The tallow can also include other mixtures with a similar distribution, such as fatty acids derived from various animal tallows and/or lard. In one example, the tallow can also be hardened (i.e., hydrogenated) such that some or all unsaturated fatty acid moieties can be converted to saturated fatty acid moieties.

Suitable examples of vegetable oil include palm oil, coconut oil, palm kernel oil, palm oil stearine, soybean oil, and hydrogenated rice bran oil, or mixtures thereof, since such oils can be among more readily available fats. One example of a suitable coconut oil can include a proportion of fatty acids having at least 12 carbon atoms of about 85%. Such a proportion can be greater when mixtures of coconut oil and fats such as tallow, palm oil, or non-tropical nut oils or fats can be used where principle chain lengths can be C_{16} and higher. The soap included in a personal care composition can be, for example, a sodium soap having a mixture of about 67-68% tallow, about 16-17% coconut oil, about 2% glycerin, and about 14% water.

Soap included in a personal care composition can also be unsaturated in accordance with commercially acceptable standards. For example, a soap included in a personal care composition can include from about 37% to about 45% unsaturated saponified material.

Soaps included in a personal care composition can be made, for example, by a classic kettle boiling process or modern continuous soap manufacturing processes wherein natural fats and oils such as tallow or coconut oil or their equivalents can be saponified with an alkali metal hydroxide using procedures well known to those skilled in the art. Soap can also be made by neutralizing fatty acids such as lauric (C_{12}), myristic (C_{14}), palmitic (C_{16}), or stearic (C_{18}) acids, with an alkali metal hydroxide or carbonate.

Soap included in a personal care composition could also be made by a continuous soap manufacturing process. The soap could be processed into soap noodles via a vacuum flash drying process. One example of a suitable soap noodle comprises about 67.2% tallow soap, about 16.8% coconut soap, about 2% glycerin, and about 14% water, by weight of the soap noodle. The soap noodles can then be utilized in a milling process to finalize a personal care composition.

Test Methods

Malodor reduction materials may be separated from mixtures, including but not limited to finished products such as consumer products and identified, by analytical methods that include GC-MS and/or NMR.

Test Method for Determining Saturation Vapour Pressure (VP)

The saturation Vapour Pressure (VP) values are computed for each PRM in the perfume mixture being tested. The VP of an individual PRM is calculated using the VP Computational Model, version **14.02** (Linux) TM available from Advanced Chemistry Development Inc. (ACD/Labs) (Toronto, Canada) to provide the VP value at 25° C. expressed in units of torr. The ACD/Labs' Vapor Pressure model is part of the ACD/Labs model suite.

Test Method for Determining the Logarithm of the Octanol/Water Partition Coefficient (log P)

The value of the log of the Octanol/Water Partition Coefficient (log P) is computed for each PRM in the perfume mixture being tested. The log P of an individual PRM is calculated using the Consensus logP Computational Model, version **14.02** (Linux) TM available from Advanced Chemistry Development Inc. (ACD/Labs) (Toronto, Canada) to provide the unitless log P value. The ACD/Labs' Consensus log P Computational Model is part of the ACD/Labs model suite.

Test Method for the Generation of Molecular Descriptors

In order to conduct the calculations involved in the computed-value test methods described herein, the starting information required includes the identity, weight percent, and molar percent of each PRM in the perfume being tested, as a proportion of that perfume, wherein all PRMs in the perfume composition are included in the calculations. Additionally for each of those PRMs, the molecular structure, and the values of various computationally-derived molecular descriptors are also required, as determined in accordance with the Test Method for the Generation of Molecular Descriptors described herein.

For each PRM in a perfume mixture or composition, its molecular structure is used to compute various molecular descriptors. The molecular structure is determined by the graphic molecular structure representations provided by the Chemical Abstract Service ("CAS"), a division of the American Chemical Society, Columbus, Ohio, U.S.A. These molecular structures may be obtained from the CAS Chemical Registry System database by looking up the index name or CAS number of each PRM. For PRMs, which at the time of their testing are not yet listed in the CAS Chemical Registry System database, other databases or information sources may be used to determine their structures. For a PRM which has potentially more than one isomer present, the molecular descriptor computations are conducted using the molecular structure of only one of the isomers, which is selected to represent that PRM. The selection of isomer is determined by the relative amount of extension in the molecular structures of the isomers. Of all the isomers of a given PRM, it is the isomer whose molecular structure that is the most prevalent which is the one that is selected to represent that PRM. The structures for other potential isomers of that PRM are excluded from the computations. The molecular structure of the isomer that is the most prevalent is paired with the concentration of that PRM, where the concentration reflects the presence of all the isomers of that PRM that are present.

A molecule editor or molecular sketching software program, such as ChemDraw TM (CambridgeSoft / PerkinElmer Inc., Waltham, Mass., U.S.A.), is used to duplicate the 2-dimensional molecular structure representing each PRM. Molecular structures should be represented as neutral species (quaternary nitrogen atoms are allowed) with no disconnected fragments (e.g., single structures with no counter ions). The winMolconn TM program described below can

convert any deprotonated functional groups to the neutral form by adding the appropriate number of hydrogen atoms and will discard the counter ion.

For each PRM, the molecular sketching software is used to generate a file which describes the molecular structure of the PRM. The file(s) describing the molecular structures of the PRMs is subsequently submitted to the computer software program winMolconn TM, version 1.0.1.3 (Hall Associates Consulting, Quincy, Mass.,), in order to derive various molecular descriptors for each PRM. As such, it is the winMolconn software program which dictates the structure notations and file formats that are acceptable options. These options include either a MACCS SDF formatted file (i.e., a Structure-Data File); or a Simplified Molecular Input Line Entry Specification (i.e., a SMILES string structure line notation) which is commonly used within a simple text file, often with a ".smi" ".txt" file name extension. The SIF file represents each molecular structure in the format of a multi-line record, while the syntax for a SMILES structure is a single line of text with no white space. A structure name or identifier can be added to the SMILES string by including it on the same line following the SMILES string and separated by a space, e.g.: C1=CC=CC=C1 benzene.

The winMolconn TM software program is used to generate numerous molecular descriptors for each PRM, which are then output in a table format. Specific molecular descriptors derived by winMolconn are subsequently used as inputs (i.e., as variable terms in mathematical equations) for a variety of computer model test methods in order to calculate values such as: saturation Vapour Pressure (VP); Boiling Point (BP); logarithm of the Octanol/Water Partition Coefficient (log P); Odour Detection Threshold (ODT); Malodour Reduction Value (MORV); and/or Universal Malodour Reduction Value (Universal MORV) for each PRM. The molecular descriptor labels used in the models' test method computations are the same labels reported by the winMolconn program, and their descriptions and definitions can be found listed in the winMolconn documentation. The following is a generic description of how to execute the winMolconn software program and generate the required molecular structure descriptors for each PRM in a composition.

Computing Molecular Structure Descriptors using winMolconn:

1) Assemble the molecular structure for one or more perfume ingredients in the form of a MACCS Structure-Data File, also called an SDF file, or as a SMILES file.
2) Using version 1.0.1.3 of the winMolconn program, running on an appropriate computer, compute the full complement of molecular descriptors that are available from the program, using the SDF or SMILES file described above as input.
   a. The output of winMolconn is in the form of an ASCII text file, typically space delimited, containing the structure identifiers in the first column and respective molecular descriptors in the remaining columns for each structure in the input file.
3) Parse the text file into columns using a spreadsheet software program or some other appropriate technique. The molecular descriptor labels are found on the first row of the resulting table.
4) Find and extract the descriptor columns, identified by the molecular descriptor label, corresponding to the inputs required for each model.
   a. Note that the winMolconn molecular descriptor labels are case-sensitive.

MORV and Universal MORV Calculation

1.) Input Molecular Descriptor values as determined via the method above into the following four equations:

$$MORV=-8.5096+2.8597\times(dxp9)+1.1253\times(knotpv)-0.34484\times(e1C2O2)-0.00046231\times(idw)+3.3509\times(idcbar)+0.11158\times(n2pag22) \quad a)$$

$$MORV=-5.2917+2.1741\times(dxvp5)-2.6595\times(dxvp8)+0.45297\times(e1C2C2d)-0.6202\times(c1C202)+1.3542\times(CdCH2)+0.68105\times(CaasC)+1.7129\times(idcbar) \quad b)$$

$$MORV=-0.0035+0.8028\times(SHCsatu)+2.1673\times(xvp7)-1.3507\times(c1C1C3d)+0.61496\times(c1C1O2)+0.00403\times(idc)-0.23286\times(nd2). \quad c)$$

$$MORV=-0.9926-0.03882\times(SdO)+0.1869\times(Ssp3OH)+2.1847\times(xp7)+0.34344\times(e1C3O2)-0.45767\times(c1C2C3)+0.7684\times(CKetone) \quad d)$$

Equation a) relates a material's effectiveness in reducing the malodor trans-3-methyl-2-hexenoic acid (carboxylic acid based malodors)

Equation b) relates a material's effectiveness in reducing the malodor trimethylamine (amine based malodors)

Equation c) relates a material's effectiveness in reducing the malodor 3-mercapto-3-methylhexan-1-ol (thiol based malodors)

Equation d) relates a material's effectiveness in reducing the malodor skatole (indole based malodors)

2.) For purpose of the present application, a material's MORV is the highest MORV value from equations 1.)a) through 1.)d).

3.) If all MORVvalues from equations 1.)a) through 1.)d) above are greater than 0.5, the subject material has a Universal MORV.

Method for assigning Fragrance Fidelity Index (FFI) and the Blocker Index (BI) for a Malodor Reduction Compound

Blocker materials suitable for use in consumer products of the present invention are chosen for their ability to decrease malodor, while not interfering with perception of a fragrance. Material selection is done by assigning two indices to a test sample material from two reference scales in order to rank odor strengths. The two reference scales are the Fragrance Fidelity Index (FFI) scale and the Blocker Index (BI) scale. The FFI ranks the ability of the test sample material to impart a perceivable odor which could cause interference when combined with another fragrance and the BI ranks the ability of the test sample material to reduce malodor perception. The two methods for assigning the indices to a test sample on the FFI and the BI reference scales are given below.

Method for Assigning the FFI to Test Samples

The first step in the method for assigning an FFI on the FFI reference scale is to create the FFI reference swatches. The swatches for the scale are created by treating clean fabrics swatches with a known amount of a known concentration of an ethyl vanillin solution. Fabric swatches for this test are white knit polycotton (4 inch×4 inch) swatches from EMC ordered as PC 50/50. The supplier is instructed to strip the swatches first, stripping involves washing twice with a fragrance-free detergent and rinsing three times.

Making the FFI Reference Swatches

Make three solutions of ethyl vanillin using a 50%/50% EtOH/water as the diluent at the following concentrations: 25 ppm, 120 ppm and 1000 ppm. Pipette 13 μL of each of the three solutions into the middle of a clean swatch resulting in about a 1 cm diameter of the solution in the middle of the swatch. This will create a sensory scale of three swatches with three different odor levels based on the concentration of the solution pipetted onto the swatch. After drying for 30

minutes in a vented hood, the swatches are wrapped in aluminum foil to prevent odor contamination to the treated swatch. A clean untreated swatch is also included as the lowest anchor point of reference for odor strength on the FFI scale. The FFI reference scale swatches should be used within 0.5 to 12 hours and discarded after 12 hours. The swatches are used as scale anchor points when graders evaluate a test sample(s) and are assigned a Fragrance Fidelity Index (FFI) as show in Table 7.

At least four perfumers/expert graders are used to rank the ethyl vanillin swatches in the FFI scale. The perfumer/expert grader needs to demonstrate adequate discrimination on the scale. The perfumer/expert panel is asked to rank order swatches according to a scale between 0 and 3. The panel must demonstrate statistical differences between the swatches as seen in Table 7.

TABLE 7

Results FFI of reference swatches from six perfumers/expert graders.

		Expert Grader							Std
FFI	Swatch	1	2	3	4	5	6	Ave	Dev.
0	Control: stripped swatch NIL ethyl vanillin	0	0	0.5	0	0	0	0.08	0.2
1	Stripped swatch with 13 μL 25 ppm ethyl vanillin	0.5	0.5	0.5	1.5	0.5	1.0	0.75	0.4
2	Stripped swatch with 13 μL 120 ppm ethyl vanillin	2.0	1.5	1.5	2.0	2.0	2.0	1.8	0.2
3	Stripped swatch with 13 μL 1000 ppm ethyl vanillin	3.0	2.0	3.0	3.0	3.0	3.0	2.8	0.4

The expert graders must demonstrate a full range of 2.5 over the 4 swatches to be acceptably discriminating. Grader 2 in table 1 has a range of only 2 and is eliminated from the panel. The panel of expert graders must also demonstrated the ability to statistically discriminate between swatches in the scale.

TABLE 8

This table demonstrates acceptable expert graders with an acceptable range and the panel meets the requirement for discriminating statistics.

		Expert Grader						Std
FFI	Swatch	1	3	4	5	6	Ave	Dev.
0	Control: stripped swatch NIL ethyl vanillin	0	0.5	0	0	0	0.08	0.2
1	Stripped swatch with 13 μL 25 ppm ethyl vanillin	0.5	0.5	1.5	0.5	1.0	0.80	0.4
2	Stripped swatch with 13 μL 120 ppm ethyl vanillin	2.0	1.5	2.0	2.0	2.0	1.9	0.2
3	Stripped swatch with 13 μL 1000 ppm ethyl vanillin	3.0	3.0	3.0	3.0	3.0	3.0	0.0

The reference swatches represent the 0, 1, 2, and 3 FFIs on the FFI reference scale, Table 9. The expert grader should familiarize them self with the strength of the odor on the FFI reference swatches by sniffing each one starting at 0 (the lowest odor strength) and ending at 3 (the highest odor strength). This should be done prior to evaluating the test sample material treated swatch.

TABLE 9

Swatch treatments comprising the Fragrance Fidelity Index (FFI) reference scale

Swatch treatment	Conc. of ethyl vanillin	FFI
Clean fabric swatch w/ 13 μL ethyl vanillin	1000 ppm ethyl vanillin	3
Clean fabric swatch w/ 13 μL ethyl vanillin	120 ppm ethyl vanillin	2
Clean fabric swatch w/ 13 μL ethyl vanillin	25 ppm ethyl vanillin	1
Clean fabric swatch NIL ethyl vanillin	NIL ethyl vanillin	0

Making Swatches Treated with the Test Material

A clean swatch is treated with 13 μL of a known concentration of a test sample material resulting in an about 1 cm of the solution on the clean swatch. Just like the reference swatches, the test sample material swatch is dried in a vented hood for 30 minutes and then wrapped in aluminum foil to prevent contamination. The test material swatches and the FFI reference swatches should be made within 2 hrs of each other. The test material swatch must be used within 0.5 to 12 hours and discarded after 12 hours.

Assigning the FFI to the Test Material

At least two perfumers/expert graders are used to assign an FFI grade to a test sample. The perfumer/expert grader smells the test sample swatch by holding that swatch 1 inch from their nose with their nose centered over the area where the test sample was pipetted on to the fabric and then assigns the test sample an FFI grade using the FFI reference scale anchor swatches as references. The test sample swatch is assigned an FFI grade at or between numbers on the FFI scale shown in Table 9. In cases where the test sample material is graded greater than 3, the test material is not a blocker material or the concentration of the material needs to be lowered and reevaluated to determine if a lower level has a malodor blocker functionality.

Method for Assigning the BI to Test Sample

The first step in the method for assigning a BI to a test sample material on the BI reference scale is to create the BI reference swatches. The swatches for the scale are created by treating clean fabrics swatches with a known amount of a known volume of isovaleric acid solution at a known concentration. Fabric swatches for this test are white knit polycotton (4 inch×4 inch) swatches from EMC ordered as PC 50/50. The supplier is instructed to strip the swatches first, stripping involves washing twice with a fragrance-free detergent and rinsing three times.

Making the BI Reference Swatches

Make one solution of 0.08% isovaleric acid using 50%/50% EtOH/water as the diluent. The BI scale contains one clean swatch with no malodor applied. Three other swatches each have a different volume of the 0.08% isovaleric acid applied. Pipette 2 μL of the 0.08% isovaleric acid solution to one clean swatch, 5 μL of the 0.08% isovaleric acid solution to the next swatch and 20 μL of isovaleric acid to the final clean swatch. These solutions are pipetted to the middle of the swatches. This will create a sensory scale of three swatches with three different odor levels based on the volume of the 0.08% isovaleric acid solution pipetted onto the swatch. After drying for 30 minutes in a vented hood, the swatches are wrapped in aluminum foil to prevent odor contamination to the treated swatch. A clean untreated swatch is also included as the lowest anchor point of

reference for malodor strength on the BI scale. The BI reference scale swatches should be used within 0.5 to 12 hours and discarded after 12 hours. The swatches are used as scale anchor points when graders evaluate a test sample(s) and are assigned a Blocker Index (BI) as show in Table 12.

At least four perfumers/expert graders are used to rank the isovaleric acid swatches in the BI scale. The perfumer/expert grader needs to demonstrate adequate discrimination on the scale. The perfumer/expert grader is asked to rank order swatches according to a scale between 0 and 3. The panel of graders must demonstrate statistical differences between the swatches as seen in Table 10.

TABLE 10

Results from six perfumers/expert graders to create the BI scale.

		Expert Grader						Std
BI	Swatch	1	2	3	4	5	Ave	Dev.
0	Control: stripped swatch NIL isovaleric acid	0	0	0	0	0	0	0
1	Stripped swatch with 2 μL 0.08% isovaleric acid	0.5	2.0	1.0	1.0	0.5	1.0	0.5
2	Stripped swatch with 5 μL 0.08% isovaleric acid	2.0	2.5	2.0	2.0	2.0	2.1	0.2
3	Stripped swatch with 20 μL 0.08% isovaleric acid	3.0	3.0	3.0	3.0	2.5	2.8	0.2

The expert graders must demonstrate a full range of 2.5 over the 4 swatches to be acceptably discriminating. The panel of expert graders must also demonstrated the ability to statistically discriminate between swatches in the scale. Expert grader #2 did not demonstrate the ability to discriminate between the swatches and is eliminated from the panel, see Table 11.

TABLE 11

This table demonstrates acceptable expert graders with an acceptable range and the panel meets the requirement for discriminating statistics.

		Expert Grader					Std
BI	Swatch	1	3	4	5	Ave	Dev.
0	Control: stripped swatch NIL isovaleric acid	0	0	0	0	0	0
1	Stripped swatch with 2 μL 0.08% isovaleric acid	0.5	1.0	1.0	0.5	0.8	0.3
2	Stripped swatch with 5 μL 0.08% isovaleric acid	2.0	2.0	2.0	2.0	2.0	0
3	Stripped swatch with 20 μL 0.08% isovaleric acid	3.0	3.0	3.0	2.5	2.9	0.2

The reference swatches represent the 0, 1, 2, and 3 BIs on the BI reference scale, Table 12. The expert grader should familiarizes him/herself with the strength of the odor on the BI reference swatches by sniffing each one starting at 0 (the lowest odor strength) and ending at 3 (the highest odor strength). This should be done prior to evaluating the swatch treated with the test material.

TABLE 12

Swatch treatments comprising the Blocker Index (BI) reference scale.

Swatch/treatment	Wt of isovaleric acid	BI
Clean fabric swatch w/ 20 μL 0.08% isovaleric acid	16 mg isovaleric acid	3
Clean fabric swatch w/ 5 μL 0.08% isovaleric acid	4 mg isovaleric acid	2
Clean fabric swatch w/ 2 μL 0.08% isovaleric acid	1.6 mg isovaleric acid	1
Clean fabric swatch NIL isovaleric acid	NIL isovaleric acid	0

Making the Malodorous Swatch and Treating it with a Test Material

To evaluate the BI, the test material is applied to a malodorous swatch to determine how well the test material blocks the malodor. The malodorous swatch is made by treating a clean swatch with 20 μL of a 0.08% solution of isovaleric acid. Dry the malodorous swatch treated with isovaleric acid in a vented hood for 30 minutes. After drying the malodorous swatch a known concentration of test material solution, between 1 ppm and 100 ppm is pipetted onto the malodorous swatch. Apply the test material solution right on top of the spot where the isovaleric acid solution was applied making an about 1 cm diameter spot. Just like the BI reference swatches, the isovaleric acid+test material swatch is dried in a vented hood for 30 minutes and then wrapped in aluminum foil to prevent contamination. The isovaleric acid+test material swatches and the BI reference swatches should be made within 2 hrs of each other. The isovaleric acid+test material swatch must be used between 1-12 hours just like the reference swatches. It is sometimes necessary to evaluate several levels of the test material between about 1 and about 100 ppm to determine the BI.

Assigning the BI to the Test Material

At least two perfumers/expert graders are used to assign the BI to the test sample. The expert grader smells the isovaleric acid+test material swatch by holding that swatch one inch from their nose with their nose centered over the area where the Test sample was pipetted on to the fabric and then assigns the isovaleric acid+test material swatch a BI based on ranking its odor strength against the odor strength of the swatches in the BI reference scale. The test sample swatch is assigned a BI at or between numbers on the BI in table. In cases where the isovaleric acid+test material swatch odor is greater than 3 on the BI reference scale, this indicates the material is not a blocker or the concentration of the test material needs to be lowered to achieve its blocker functionality.

Malodor Reduction Compounds with FFI and BI Grades based on the aforementioned

Table Ref #	CAS#	log P	Name	Conc	FFI	BI
281	54830-99-8	3.11	3a,4,5,6,7,7a-hexahydro-4,7-methano-1H-indenyl acetate	10 ppm	0	2.0
				50 ppm	0.5	2.0

-continued

Malodor Reduction Compounds with FFI and BI Grades based on the aforementioned

Table Ref #	CAS#	log P	Name	Conc	FFI	BI
677	139504-68-0	3.75	1-((2-(tert-butyl)cyclohexyl)oxy)butan-2-ol	10 ppm	0	2.3
				50 ppm	1.8	2.0
962	55066-48-3	3.17	3-methyl-5-phenylpentan-1-ol	10 ppm	0	2.3
				50 ppm	0.5	1.7
261	173445-65-3	3.29	3-(3,3-dimethyl-2,3-dihydro-1H-inden-5-yl)propanal	10 ppm	0	1.8
				50 ppm	1.3	1.3
1139	87731-18-8	2.11	(Z)-cyclooct-4-en-1-yl methyl carbonate	10 ppm	0	2.0
				50 ppm	1.0	2.7
	4430-31-3	1.43	3,4,4a,5,6,7,8,8a-octahydrochromen-2-one	10 ppm	0	2.0
				50 ppm	0	2.0
204	40379-24-6	3.89	7-methyloctyl acetate	10 ppm	0	2.0
				50 ppm	0	2.7
1005	93981-50-1	5.59	ethyl (2,3,6-trimethylcyclohexyl) carbonate	50 ppm	0.5	2.6
391	106-33-2	5.73	Ethyl laurate	50 ppm	0.3	2.2
1148	1139-30-6	4.06	Caryophyllene Oxide	50 ppm	0.5	2.3
524	13877-91-3 3338-55-4	4.31	3,7-Dimethyl-1,3,6-Octatriene(cis-β ocimene 70%)	50 ppm	0	2.8
1149	23787-90-8	4	1,3,4,6,7,8alpha-hexahydro-1,1,5,5-tetramethyl-2H-2,4alpha-methanophtalen-8(5H)-one	10 ppm	0	1.5
				50 ppm	0.8	2.3
	112-42-5	4.62	Undecanol	50 ppm	0.8	2.3
174	112-53-8	5.17	1-dodecanol	50 ppm	0.5	2.3
	98-52-2	2.78	4-tert-butyl cyclohexane	10 ppm	0	2.0
				50 ppm	0.3	2.0
109	112-39-0	6.41	Methyl palmitate	10 ppm		2.0

Malodor Control Compounds with Improved Performance at Lower Levels.

Below are some non-limiting examples of preferred behavior by which the malodor control compound gives improved malodor control at lower concentration. These nonlimiting data provide additional compelling data that malodor is being blocked, not masked.

Table Ref #	CAS#	Name	Conc	FFI	BI
N/A	68912-13-0	8,8-dimethyl-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl propionate	10 ppm	0	1.5
			50 ppm	0	2.2
N/A	TBD	4,8-dimethyl-1-(methylethyl)-7-oxybiciclo [4.3.0]nonane	10 ppm		2.0
			50 ppm	0.3	2.2

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Retesting Malodor Reduction Compounds at Lower Levels.

The example below demonstrates that while a malodor control compound could fail to demonstrate odor blocking (BI >2.5) at a higher concentration it should be retested at a lower concentration to determine if it passes.

Table Ref #	CAS #	Name	Conc	FFI	BI
N/A	173445-65-3	1H-Indene-5-propanal, 2,3-dihydro-3,3-dimethyl-	10 ppm	0	1.5
			50 ppm	0.5	2.7

Example 1

Compositions Comprising Malodor Reduction Compounds

In the present invention blends enable more potent malodor reduction because blends are useful at a higher % of the product composition before becoming olfactively noticeable. Below are non-limiting examples of malodor reduction compounds.

		% wt Active				
Component	CAS#	A	B	C	D	E
2,2,8,8-tetramethyl-octahydro-1H-2,4a-methanonapthalene-10-one	29461-14-1	35-45	15-25	5-20	10-30	15-25
1H-Indene-ar-propanal, 2,3-dihydro-1,1-dimethyl-	300371-33-9	10-20	1-30	NIL	5-10	1-5
Hexadecanoic acid, (2E)-3,7-dimethyl-2,6-octadien-1-yl ester	3681-73-0	35-45	10-25	NIL	30-40	35-50
1-Pentanol-3-methyl-5-phenyl	55066-48-3	10-20	10-25	2-10	5-17	10
4,7-Methano-1H-inden-5-ol, 3a,4,5,6,7,7a-hexahydro-, 5-acetate	171102-41-3	0-5	10-25	NIL	1-6	1-5
4,8-dimethyl-1-(methylethyl)-7-oxybiciclo [4.3.0]nonane	N/A	0-5	NIL	NIL	NIL	1-5

-continued

Component	CAS#	% wt Active A	B	C	D	E
(3Z)-3,7-dimethylocta-1,3,6-triene	3338-55-4	NIL	NIL	10-20	2-5	NIL
1H-Indene-5-propanal, 2,3-dihydro-3,3-dimethyl-	173445-65-3	NIL	NIL	NIL	7.5-16	1-15
3,4,4a,5,6,7,8,8a-octahydrochromen-2-one	4430-31-3	NIL	NIL	NIL	3-7	1-15
1-(2-tert-butylcyclohexyl)oxybutan-2-ol	139504-68-0	NIL	NIL	NIL	0.25-1.5	NIL
ethyl (2,3,6-trimethylcyclohexyl) carbonate	93981-50-1	NIL	NIL	15-30	NIL	2
benzyl 2-hydroxypropanoate	2051-96-9	NIL	NIL	2-5	NIL	NIL
(3,5-dimethylcyclohex-3-en-1-yl)methanol	67634-16-6	NIL	NIL	5-30	NIL	NIL
2-Dodecanol	10203-28-8	NIL	0.25-1	NIL	0.5-3	NIL

Example 2

Compositions Comprising Malodor Reduction Compounds

Ingredient	CAS #	% wt Active A	B	C	B	D	E
(E)-1-(2,6,6-trimethyl-1-cyclohex-2-enyl)pent-1-en-3-one	127-42-4	4	8	2	8	3	2
ethyl dodecanoate	106-33-2	NIL	1	NIL	3	NIL	NIL
3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-1-yl propanoate	68912-13-0	8	30	1	4	1	3.5
[1R-(1R*,4R*,6R*,10S*)]-4,12,12-trimethyl-9-methylene-5-oxatricyclo[8.2.0.04,6]dodecane	1139-30-6	NIL	0.3	2	0.5	NIL	0.5
(8E)-cyclohexadec-8-en-1-one	3100-36-5	NIL	5	NIL	7	NIL	NIL
3,5,5-trimethylhexyl acetate	58430-94-7	25	15	50	35	60	56
ethyl (2,3,6-trimethylcyclohexyl) carbonate	93981-50-1	NIL	1	NIL	5	NIL	NIL
2,4-dimethyl-4,4a,5,9b-tetrahydroindeno[1,2-d][1,3]dioxine	27606-09-3	25	10	15	15	16	15
2,2,7,7-tetramethyltricyclo[6.2.1.01,6] undecan-5-one	23787-90-8	8	9	5	7	5	5
(3,5-dimethylcyclohex-3-en-1-yl)methanol	67634-16-6	NIL	0.7	NIL	0.5	NIL	NIL
3-(7,7-dimethyl-4-bicyclo[3.1.1]hept-3-enyl)-2,2-dimethylpropanal	33885-52-8	30	20	25	15	15	18
Total		100	100	100	100	100	100

Example 3

Malodor Reduction Composition

Ingredient	CAS #	% wt Active A	B	C
5-Cyclohexadecen-1-One	37609-25-9	15.0	2.00	2.00
decahydro-2,2,7,7,8,9,9-heptamethylindeno(4,3a-b)furan	476332-65-7	0.005	0.01	0.01
2,3-Dihydro-5,6-dimethoxy-2-(4-piperidinylmethylene)-1H-inden-1-one	33704-61-9	0.3	0.5	0.5
Cedryl Methyl Ether	19870-74-7	6.0	10.0	4.0
Trans-4-Decenal	65405-70-1	0.005	0.002	0.002

-continued

Ingredient	CAS #	% wt Active A	B	C
Decyl Aldehyde	112-31-2	3.74	2.0	2.0
3-methyl cyclopentadecenone	63314-79-4	0.4	1.0	1.0
Diphenyl Oxide	101-84-8	0.5	1.0	1.0
3a,4,5,6,7,7a-hexahydro-4,7-methano-1H-indenyl acetate	54830-99-8	5.0	8.0	8.0
3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-1-yl propanoate	68912-13-0	6.0	8.0	8.0
2-(5-methyl-2-propan-2-yl-8-bicyclo[2.2.2]oct-5-enyl)-1,3-dioxolane	68901-32-6	10.0	15.0	15.0
(E)-3,7-dimethyl-2,6-octadienylhexadecanoate	3681-73-0	10.0	10.0	16.0
Iso Nonyl Acetate	58430-94-7	6.65	8.0	3.0
2,2,7,7-tetramethyltricyclo[6.2.1.01,6]undecan-5-one	23787-90-8	10.0	8.0	8.0
(1-Methyl-2-(1,2,2-trimethylbicyclo[3.1.0]-hex-3-ylmethyl)cyclopropyl)methanol	198404-98-7	0.1	0.3	0.3
Lauric Aldehyde	112-54-9	0.625	1.0	0.7
Methyl Iso Eugenol	93-16-3	18.000	10.0	13.0
Methyl hexadecanoate	112-39-00	3.000	10.0	12.0
2,3-dihydro-1,1-1H-dimethyl-indene-ar-propanal	300371-33-9	0.400	0.0	0.3
4-tert-butylcyclohexanol	98-52-2	0.400	0.1	0.1
2-isobutyl-4-hydroxy-4-methyltetrahydropyran	63500-71-0	1.600	2.0	2.0
Undecyl Aldehyde	112-44-7	1.725	2.888	1.888
Undecylenic Aldehyde	112-45-8	0.550	0.2	1.2
Total		100	100.0	100.0

Examples 4.1-4.3

Body Wash with Malodor Reducing Composition

An example of Body Wash compositions prepared with malodor reduction composition, according to the compositions shown in Example 1.

	4.1 Body Wash	4.2 Body Wash	4.3 BodyWash
Sodium Laureth-3 Sulfate (as 28% active)	27.85%	27.85%	27.85%
Water	Q.S.	Q.S.	Q.S.
Sodium Lauryl Sulfate (as 29% active)	10.34	10.34	10.34
Cocamidopropyl Betaine B (30% active)	4.01	4.01	4.01
Citric Acid	0.18	0.18	0.18
Sodium Benzoate	0.3	0.3	0.3
Disodium EDTA	0.12	0.12	0.12
Methylchloroisothiazolinone/ Methylisothiazolinone	0.04	0.04	0.04
Sodium Chloride	2.35	1.7	1.6
Neat Perfume	1.25	1	2
Malodor reducing composition	0.25	0.175	0.25

QS - indicates that this material is used to bring the total to 100%

Examples 5.1-5.6

Shampoo with Malodor Reducing Composition

An example of Shampoo compositions prepared with malodor reduction composition, according to the compositions shown in Example 1.

Ingredient	5.1	5.2 Wt %	5.3
Ammonium Laureth Sulfate[1]	14.1	14.1	14.1
Ammonium Lauryl Sulfate[2]	3.1	3.1	3.1
Ammonium Xylenesulfonate[3]	0.45	0.45	0.45
TWEEN 60[4]	3.0	3.0	3.0
Polyquaternium-10[5]	0.35	0.35	0.35
Cetrimonium Chloride[6]	0.5	0.5	0.5
Selenium Sulfide[7]	1.0	1.0	1.0
Dimethicone[8]	0.60	0.60	0.60
Ethylene Glycol Distearate[9]	3.0	3.0	3.0
Cocamide MEA[10]	3.0	3.0	3.0
Zinc Pyrithione[11]	—	0.2	0.2
Zinc Carbonate[12]	—	—	1.61
Neat Fragrance	1.1	0.75	0.75
Malodor reducing composition	0.25	0.25	0.175
Cetyl Alcohol[13]	0.42	0.42	0.42
DMDM Hydantoin	0.40	0.40	0.40
Sodium Chloride	0.30	0.30	0.30
Stearyl Alcohol[14]	0.20	0.20	0.20
Hydroxypropyl Methylcellulose[15]	0.02	0.02	0.02
Water	Q.S.	Q.S.	Q.S.

[1]Ammonium Laureth Sulfate at 25% active, supplier: P&G
[2]Ammonium Lauryl Sulfate at 25% active, supplier: P&G
[3]Ammonium Xylene Sulfonate 40% active, supplier: Stepan
[4]Polysorbate 60 TM, supplier: Croda
[5]UCARE Polymer LR400 TM, supplier - Dow Chemical
[6]cetrimonium chloride, supplier - Croda
[7]Selenium disulfide, supplier Eskay
[8]Viscasil 330M TM from Momentive Performance Materials with a viscosity of 330,000 cSt (centistokes).
[9]Ethylene Glycol Disterate, supplier: Stepan
[10]Ninol COMF TM from the Stepan Company
[11]Zinc Pyrithione, supplier Lonza
[12]Zinc Carbonate Basic, supplier Pan Continental Chemical
[13]Cetyl Alcohol, supplier P&G
[14]Stearyl Alcohol, supplier P&G
[15]Methocel TM, supplier Dow Chemical

Ingredients	5.4	5.5 Wt %	5.6
Ammonium Laureth Sulfate[1]	14.1	14.1	14.1
Ammonium Lauryl Sulfate[2]	3.1	3.1	3.1
Ammonium Xylenesulfonate[3]	0.45	0.45	0.45
TWEEN 60[4]	3.0	3.0	3.0
Polyquaternium-10[5]	0.35	0.35	0.35
Cetrimonium Chloride[6]	0.5	0.5	0.5
Selenium Sulfide[7]	1.0	0.2	0.2
Dimethicone[8]	0.60	0.60	0.60
Ethylene Glycol Distearate[9]	3.0	3.0	3.0
Cocamide MEA[10]	3.0	3.0	3.0
Zinc Pyrithione[11]	—	1.0	1.0
Zinc Carbonate[12]	—	—	1.61
Neat Fragrance	0.65	0.85	1.0
Malodor reducing composition	0.175	0.175	0.175
Cetyl Alcohol[13]	0.42	0.42	0.42
DMDM Hydantoin	0.40	0.40	0.40
Sodium Chloride	0.30	0.30	0.30
Stearyl Alcohol[14]	0.20	0.20	0.20
Hydroxypropyl Methylcellulose[15]	0.02	0.02	0.02
Water	Q.S.	Q.S.	Q.S.

[1]Ammonium Laureth Sulfate at 25% active, supplier: P&G
[2]Ammonium Lauryl Sulfate at 25% active, supplier: P&G
[3]Ammonium Xylene Sulfonate 40% active, supplier: Stepan
[4]Polysorbate 60 TM, supplier: Croda
[5]UCARE Polymer LR400 UTM, supplier - Dow Chemical
[6]cetrimonium chloride, supplier - Croda
[7]Selenium disulfide, supplier Eskay
[8]Viscasil 330M TM from Momentive Performance Materials with a viscosity of 330,000 cSt (centistokes).
[9]Ethylene Glycol Disterate, supplier: Stepan
[10]Ninol COMF TM from the Stepan Company
[11]Zinc Pyrithione, supplier Lonza
[12]Zinc Carbonate Basic, supplier Pan Continental Chemical
[13]Cetyl Alcohol, supplier P&G
[14]Stearyl Alcohol, supplier P&G
[15]Methocel TM, supplier Dow Chemical

In an embodiment of the present invention, the example of Shampoo compositions (Example 5) may also be prepared with the malodor reduction composition according to the compositions shown in Example 2 and/or Example 3.

The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm."

Every document cited herein, including any cross referenced or related patent or application is hereby incorporated herein by reference in its entirety unless expressly excluded or otherwise limited. The citation of any document is not an admission that it is prior art with respect to any invention disclosed or claimed herein or that it alone, or in any combination with any other reference or references, teaches, suggests, or discloses any such invention. Further, to the extent that any meaning or definition of a term in this document conflicts with any meaning or definition of the same term in a document incorporated by reference, the meaning or definition assigned to that term in this document shall govern.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is, therefore, intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

What is claimed:

1. A liquid rinse-off personal care composition comprising, based on total composition weight,

a) from about 0.001% to about 0.025%, by weight of the composition of a malodor reduction material comprising 1, 3, 4, 6, 7, 8 alpha-hexahydro-1, 1, 5, 5-tetramethyl-2H-2, 4 alpha-methanophthalen-8(5H)-one; and

b) from about 0% to about 12% of a perfume;

c) from about 60% to about 95% of an aqueous carrier; and

d) from about 3% to about 30% of a surfactant.

2. The personal care composition according to claim **1**, wherein the ratio by weight of said perfume to said malodor reduction material being from about 1000:1 to about 1:1.

3. The personal care composition according to claim **1**, said composition comprising an adjunct ingredient selected from the group consisting of clay mineral powders, pearl pigments, organic powders, emulsifiers, distributing agents, pharmaceutical active, topical active, preservatives, surfactants and mixtures thereof.

4. The personal care composition according to claim **1**, comprising from about 0.001% to about 0.005%, by weight of the composition of the 1, 3, 4, 6, 7, 8 alpha-hexahydro-1, 1, 5, 5-tetramethyl-2H-2, 4 alpha-methanophthalen -8(5H)-one.

* * * * *